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THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—31ST YEAR. SYDNEY, SATURDAY, NOVEMBER 25, 1944. No. 22.

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MEDICAL EDUCATION AND RESEARCH: IMPRESSIONS OF AN AMERICAN VISIT.[1]

By F. M. BURNET, F.R.S.,
Director, Walker and Eliza Hall Institute of Research in Pathology and Medicine, Melbourne.

DURING December, January and February last I was in the United States of America. The occasion of my visit was an invitation to deliver the Dunham lectures at Harvard Medical School and my main interest was to see as much as I could of the work in progress on infectious disease, particularly on virus diseases.

I was very little concerned with clinical medicine or surgery, and most of the technical matters in which I was interested would be inappropriate for discussion at a meeting such as this. I did, however, bring back a renewed appreciation of the importance of research and of the scientific method in medicine, and I should like, with your permission, to make the main theme of my talk the part that can and should be played by the more purely scientific aspects of medicine in the future development of medicine and medical education in Australia. In America, I had an opportunity to sense something of the spirit in the great centres of medical education and research—and unless I am greatly mistaken the primary attitude toward medicine there was an eager enthusiasm to apply the scientific method to its limit, an enthusiasm continually being whetted by successful achievement.

I know that clinicians will rightly tend to be sceptical of the possibility of a purely scientific approach to medicine. But a scientific attitude to medicine does not mean that careful clinical examination, an understanding of human personality and common sense are to be replaced wholesale by a reliance on laboratory tests for diagnosis, or that treatment should be wholly a matter of injections and blood level determinations of one sort or another. I do not think, however, that anyone can deny that the major successes of medicine in our day have sprung almost wholly from the application of the scientific method, and more from the laboratories than from the wards.

In America, as in every other country at war, science is geared to the war effort. Possibly more there than anywhere else one finds the conscious or unconscious realization that science and scientific technology provide the only means by which wars nowadays are decided. I saw only the outward signs of the enormous activity in technical laboratories, munition plants and shipyards, but I saw something at closer quarters of the work initiated by the American army in regard to the control of infectious disease. Almost every research worker of repute in this field is engaged on some aspect of the problem. Research on infectious disease has always been generously supported in the United States, but with the impact of the war this support has been increased many fold. The military importance of infectious disease has always been realized. Today there is in addition a new realization that an adequate scientific attack on almost any problem will provide a practical solution of it. Most of the workers I met were enthusiastic about the opportunity the war had given them to study adequately aspects of their own particular problems. Every field of infectious disease was under study, and in many of them highly important advances were being made, not only in the immediate matter of preventing disease in servicemen, but also in regard to the fundamentals of the subject.

This brings me to what may be one of the most significant aspects of current American history. In medical research (and probably in every other branch of applied science) I found not only an enthusiasm for the

[1] Read at a meeting of the Victorian Branch of the British Medical Association on September 6, 1944.

detailed work on hand, but a magnificent confidence that American intelligence and material resources were adequate to tackle all the problems. Two aspects of their approach particularly impressed me—the realization that big new advances which can come only from fundamental laboratory work are as much needed in war as the application of current knowledge to immediate military problems, and second, the readiness to make large-scale human experiments when these seemed to be needed. I am sufficiently an optimist to believe that this American confidence in the validity of the experimental method and their vigour in applying it is likely to provide the mainspring for the reconstruction of civilization after the war.

Some Characteristic Phases of Medical Research in America.

Before discussing the position of medical research in Australia, I should like to give a few brief sketches of representative examples of research that I saw in progress while I was in America. They are chosen not because of any bearing on my own technical interests, but because they exemplify the main type of current research in medical fields.

The first type is the combination of action and investigation to deal with practical problems of public health. Such work is essentially an application of established knowledge; but it is also research in the sense that no public health procedure can be applied on a large scale without an entrance into new problems and the revelation of new leads for useful investigation. As an example, I mention the activities of the City of Chicago Health Department in its effort to rid that city of syphilis. There are many ways of looking at venereal disease; but if it is viewed simply as a problem in the prevention of infectious disease, and if human nature and social conditions are accepted as they are, the major requirement is that every person with syphilis should be detected and rendered non-infective for others at the earliest opportunity. This is the realistic approach of Chicago to the problem. The attempt to accomplish it involved an active propaganda and case-finding programme and treatment by an intensive three-day course in hospital. The standard treatment is by combined artificial fever and arsenical injection, the aim being to accomplish Ehrlich's original ideal of a complete sterilizing therapy. The patient's body temperature is maintained at 106° F. with an adequate blood concentration of arsenic for six to eight hours. It is a drastic procedure, not without danger; but there seems to be little doubt that it does succeed in rendering the patient non-infective within three days of the treatment. There are hints that equally rapid and less dangerous methods of rendering a syphilitic non-infectious will become available when the action of penicillin on syphilis has been fully investigated. But, whatever the technical means employed, I feel sure that from the public health angle the principle of rendering the patient non-infective from the time he first leaves the clinic is absolutely sound. The Chicago experiment represents a vigorous attempt by a public health authority to apply that principle by the best available means.

The second type of research activity is what might be called the standard type of clinical research. At the Massachusetts General Hospital there is the Thorndike Memorial Laboratory which is devoted wholly to clinical research. Here I met Minot, Castle and Maxwell Finland. The work of Minot and Castle on pernicious anæmia is world famous. It represents perhaps the outstanding example of a combined clinical and laboratory study leading to a supremely important therapeutic advance. From the nature of my interests I was particularly impressed with the work of Finland on the bacteriology of the respiratory infections, and with the way in which his department could combine routine bacteriological work and laboratory research with a direct interest in the clinical aspects of infectious disease. At the moment their major interest was to determine the place of penicillin, sulphonamides and antiserum in the treatment of pneumonia.

These two types of research are both concerned with immediate disease problems in human beings. The third type is further removed from the clinical sphere, investigation taking place wholly in the laboratory. This is research in the basic medical sciences, physiology, biochemistry, microbiology and pharmacology with fairly direct bearing on some matter of clinical importance. Work of this category is the special function of the great medical research institutes and of the preclinical departments of medical schools like that of Harvard.

At Harvard I saw something of Cohn's work on the fractionation of human plasma. Cohn is a physical chemist interested primarily in the nature of proteins as physico-chemical systems. He is not a clinician nor even a biologist; but his knowledge of proteins and his ability to collect and stimulate a magnificent team of collaborators seem likely to revolutionize the use of human blood products in medicine. His view is simply that in human plasma there are many known and perhaps more unknown components of physiological importance and of potential value in medicine. If they are to be used effectively they should be separated from useless material and administered as pure or nearly pure substances of known activity. Technical methods for the isolation of proteins from complex mixtures like blood plasma are sufficiently advanced to make this a practical procedure even on the commercial scale. Pure serum albumin is already being made on a large scale as a standard blood substitute for the United States Navy. To a virus worker and immunologist the fraction known as γ globulin is even more important, for this carries all the natural antibodies and at the present time represents the only weapon we have for the specific prevention or treatment of the common virus diseases. When I was in Boston γ globulin was available in almost pure form and had been used successfully in the prevention of measles and mumps. From recent cables I gather that it is now being produced on a commercial scale.

Two features of this work that impressed me were the effectiveness of a full-scale professional attack along physico-chemical lines in dealing with some problems which superficially appear wholly biological, and second, the great value of team work by men with training and ability in widely different fields. There are not many advances to be made nowadays in the basic medical sciences which can be brought to the stage of practical value without such team work.

Finally, I would include a fourth type of activity under "medical research", even though it is at present completely remote from clinical application. Any important advance in the biological sciences will sooner or later affect medical thought and practice. At Stanford University I spent an interesting few hours in the laboratory of Dr. G. W. Beadle, a geneticist who has developed a novel approach to the general biochemistry of living cells. His experimental material is a mould Neurospora—not unlike Penicillium in general character—and various mutant forms produced by X-radiation of its spores. These mutants differ from the original form in their growth requirements; instead of growing like the original on a simple predominantly inorganic medium they require some addition—amino acid, vitamin or some other type of organic compound. By a combination of genetic study with biochemical analysis of the detailed growth requirements of about 200 mutant forms Beadle has been able to show, first, that in each mutant there is a loss of power to synthesize one essential building stone of the hundreds of thousands required to make up the chemical structure of living protoplasm, and second, that this characteristic in each case represents a typical gene mutation.

It would take too long to describe how this technique can be elaborated to show for instance the various stages by which the tryptophane molecule is built up from anthranilic acid via indol, or to demonstrate that essentially the same type of reaction produces urea in the mould as in man. The whole work gives an amazing impression of the uniformity of the essential biochemistry of living matter and an equally vivid realization of the extraordinary complexity of living structure and function. Just as when one studies anatomy one tends to forget that every bone and organ has both a function and an individual

history that runs back to that amorphous sphere, the fertilized ovum, so when one finds in some simple organism like Neurospora a vitamin (thiamin, for instance) it is easy to forget that a complete synthesis step by step is as necessary for its production in the mould cell as in the laboratory. For Neurospora to produce thiamin from little more than glucose, water and inorganic salts, is as much a feat as for the chemist to produce nylon stockings from coal, air and water.

At present Beadle's work has no direct medical applications, but I would remind you that Neurospora is a not very remote relation of Penicillium, another mould that was of no medical interest a few years ago. The great practical advances in medicine and technology have more often than not sprung from purely academic investigations, and no organization for medical research can afford to deny opportunity to the man who has uncovered something really new in any of the biological sciences.

The Future of Medical Research in Australia.

Research is one of the most complex of human activities, and in discussing some aspects of the future of medical research in Australia, I shall limit myself almost wholly to three topics: (i) the justification for medical research in Australia, (ii) the selection and training of medical research workers and (iii) the provision of opportunity for senior workers.

I think we should, first of all, make a realistic examination of the question as to whether it is necessary that any medical research at all should be carried out in Australia. I have a vested interest in concluding, as I shall, that medical research must play a part in the structure of medicine in Australia. But I should like to give a fair statement of the opposite point of view, because there is a tendency to agree without thought that medical research, like orchestral concerts, picture galleries, boys' clubs, orphanages and bush fire brigades, is a good thing for Australia, and to leave it at that.

It is only too evident to anyone who makes a tour of the major centres of medical research overseas that if all research activity in Australia stopped abruptly the effect on the progress of medical science would be completely insignificant. Advance moves fastest where there are the best facilities for work and for the exchange of ideas. A centre which can draw on the men and material resources of a nation of 130 millions has a more than twenty-fold advantage over any similar centre in a nation of seven millions. In science, as in other spheres, nothing succeeds like success, and as an Australian one must recognize with regret how successfully overseas centres have drawn away our best workers in all branches of science. This gravitational process by which large centres tend to grow at the expense of smaller ones seems to be almost inevitable, and I should have to agree with the view that in regard to world science, Australia and the other outlying countries have in the past served mainly as nurseries from which men of ability could be sent to the major centres to assist there in the effective advance of knowledge. This movement will be even more characteristic of the future than of the past unless positive action is taken to reverse it. It is, in fact, a natural characteristic of human society, and if I am to argue in favour of an attempt to change it, it is necessary to show that such a change is essential for the well-being of Australia as a civilized nation. In essence the problem is: Can the maintenance of health and medical care of the Australian people be effectively carried out if we rely solely on the application to local conditions of discoveries and developments made overseas? It is with this vital and specific question constantly in the background that I have tried to formulate the position and potentialities of medical research in Australia.

My own activities in medical investigation have been within the walls of one Australian research institute apart from periods of work in England, and the most natural way for me to discuss the function of research is to consider the responsibilities of the research institutes which, like the Walter and Eliza Hall Institute, are closely associated with a great teaching hospital.

The institute has two major functions, distinct but overlapping. There is first its obligation to assist in making the associated hospital and clinical school as effective as possible, particularly in regard to the training of its under-graduate and post-graduate students, and second, its obligations to help to the limit of its capacity in increasing the world's stock of working knowledge and of valid generalization within the wide bounds of medical science. There are other temporary or subsidiary functions. At the present time we feel that our obligation to assist in medical problems of the services is more important than any other. Another minor function of a centre of research is, I think, to provide either for medical or for lay consumption simplified but accurate accounts of the progress of knowledge relevant to the needs and interests of the audience concerned.

Let me speak first of the importance to a teaching hospital of being associated with an active research organization. Speaking as an outsider with a theoretical rather than a practical outlook on medicine, I should say that effective medical care is greatly hampered by two general characteristics of the human attitude toward disease. Measures for the prevention of disease will always have to overcome the general refusal on the part of most people to subject themselves to self-discipline, discomfort or minor danger as an insurance against future illness. And on the curative side of medicine we find the insistent demand of the average man when he is ill that positive measures must be taken to "cure" him. This second characteristic is the one that concerns the teaching hospital as at present constituted. It is a platitude to hold that the function of a hospital, as of any medical practitioner confronted with illness, is to determine as accurately as possible what is the nature of that illness and then to carry out such procedures as are necessary to allow the patient again to function as an effective unit in the community. But if we underline the word necessary, the remark is, I think, far from platitudinous.

One of the first requirements for the improvement of medical practice is that our clinical schools shall produce men able to assess and provide what is necessary for treatment and to be swayed no more than is humanly inevitable by tradition, expediency and the pressure of commercial advertising. Hospital teaching must necessarily be largely a training in the art of medicine and the understanding of human personality, as well as in the application of science; but I think that there is also a special need to inculcate common sense in the use of auxiliary diagnostic procedures and in determining the amount and type of treatment that its really necessary. A wise clinician will be able to provide a personal example of such a point of view; but it can be driven home much more effectively by actual contact with a clinical research project in operation than in any other way.

No medical man's education is complete until he has been personally associated with an example of each of two standard types of clinical investigation. The first is on the significance of some type of diagnostic procedure—a skin test, an X-ray finding, the level of some component of the blood or what not. Such an investigation will always require the assessment of the test and its range of variability in healthy subjects as well as its relationship to the specific disease condition under study. In such work even to serve as a "normal control" evokes an interest in the final results which cannot be gained merely by reading of some similar investigation elsewhere. A healthy student who knows that he reacts to the Mantoux test or has a slightly aberrant lead in his electrocardiogram will be a more critical judge of such diagnostic tests than one who has seen them carried out only on patients.

The second type of investigation is the "therapeutic trial" in which a new therapeutic procedure is to be evaluated. Every student or practitioner knows the general requirement in such tests—namely, that the procedure under test be applied to one group of patients while an equal number strictly comparable in all relevant characteristics receives standard hospital treatment for the condition. The actual conduct of such an investigation, however, is extremely valuable in emphasizing the impor-

tance of various other factors than that under study in determining the outcome, and the difficulty of controlling them. The analysis of the results, too, will I think in nearly all instances induce a certain valuable humility in regard to the limitations of therapeutic action, an appreciation of the spontaneous recuperative power of the body and at least some sense of the function of statistical analysis.

In its relation to the hospital, work of one or other of these types is an essential part of the work of an institute like my own, and in the post-war years I shall be disappointed if we should ever fail to have a steady stream of young graduates engaged in clinical research of this type. Most of this work will necessarily be of only minor importance in regard to the general advance of medical science. Much of it will be merely confirmatory of some overseas development in diagnosis or therapeutics. But research within a teaching hospital has other functions than its primary object of accumulating useful knowledge. I have touched on the value of association with clinical research to the education of hospital students. Secondly, research of this type serves as a rule as the channel by which important new advances are incorporated into the general routine of practice in any outlying centre like Australia. Then, the very fact that a wholehearted piece of clinical research is being carried out on some type of illness in the hospital will almost without exception ensure to the patients concerned a better prospect of recovery. Enthusiasm is always the best stimulus to effective work of any sort.

I have left the most important function of clinical research till last—its function as part of the post-graduate education of those responsible for its conduct. At Harvard I was very impressed by the insistence that a man should carry through a solid, successful piece of investigation before he was fitted to teach clinical medicine or surgery. As Dunham lecturer, I was for a fortnight a member of the staff of the finest medical school in America, perhaps of the world, and I had a splendid opportunity to sense something of the reason for its greatness. Subject always to the criticism that I found what I was looking for, I should say that this reason was the wholehearted recognition that medicine today can advance only as a science advances, that the men who teach it must be trained in the methods of scientific investigation, and that the senior teachers must have time and opportunity to keep alight the enthusiasm for research that gained them their present status.

I know that many will consider it highly inadvisable that the education of general practitioners should be largely in the hands of men who have had no experience of general practice and who are interested more in the theoretical aspects of medicine than in its application in everyday circumstances. Since I wrote a first draft of this lecture, I have been reading Sir Thomas Lewis's recent articles on the same theme, and here I would like to stress his differentiation between theoretical and vocational education. For the great majority of students the primary requirement is a good vocational training. It would be positively dangerous as well as futile to attempt to inculcate the idea that every patient must be considered as an independent scientific problem. As Lewis says, "public safety requires and public opinion rightly insists upon a close adherence by the generality of doctors to what at the time are regarded as the established rules of an art".

Good vocational training by men actively engaged in the practice of medicine will always be the core of clinical teaching. But the only thing of which we can be certain is that the established rules of the art of medicine will change increasingly toward a dependence on accurate knowledge rather than on empiricism and acquiescence in popular prejudice. I think we shall find that in the future we shall need, as teachers of the vocational side of medicine, also men who have been throughly imbued with the necessity for the scientific approach. What I am particularly concerned with is that clinical teaching should provide also for the stimulation and training of the minority of better students from whom the clinical teachers and investigators of the future must be drawn. To use a biological metaphor, if the mass of general and specialist practitioners represent the body of medicine, the medical schools with their experience and developing tradition represent the evolving germ plasm. To maintain a steady improvement in the quality of medical practice demands an equally steady improvement at a higher level in the quality of clinical practice and teaching in the medical schools. This can be attained only if at least the same attention is paid to the special needs of the brilliant student as to the requirements for the education of sound practitioners.

To summarize these contentions: if clinical teaching in Australia is to develop in accordance with world trends, the clinical schools must be associated with adequate research organizations. These must accept responsibility for the training in research methods of a proportion at least of those graduates who may be expected to become clinical teachers, and they must see that arrangements are made to allow all students to see and appreciate something of the clinical research being undertaken in the hospital.

So far I have been concerned only with one rather neglected aspect of research, its educational value. But education of the research worker is only an indirect function of a research institute. Its primary function is to add to the world's store of accurate knowledge in some field of medical science. Except for an occasional fortunate chance, significant advances in knowledge will not come from clinical research carried out essentially as part of the education of a young graduate. Real discovery is not something that can be provided to order by the director of a research organization. All that past experience can tell him is that discovery springs only from the activity of individual men with ability and ideas. A director's primary function is to find men with such potentialities, to assist them to find their particular field of study and to give them every encouragement and opportunity to make a real contribution to science.

In a medical research institute there must be a place for the worker in the basic medical sciences as well as for the clinical research worker. In fact, it will probably be exceptional for any clinical research to develop into a worth-while contribution without an associated investigation in one or other of the primary medical sciences.

The Selection and Training of Research Workers.

Research that is worthy of the name can be carried out only by men of high intellectual quality, and as in every other instance where the problem is to obtain men for really high-grade work, whether it is scientific, technical or administrative, wise selection and the provision of opportunity are much more important than the details of training.

If medical and other types of scientific research are to continue in Australia, we must be able to attract men of the necessary calibre into the field. More than in any other career it will be necessary to attract men rather than to direct them to research by any form of authority or economic pressure. Two things seem to be chiefly necessary. The first is that there shall be a general temper of the community such that science is felt to be a necessary and increasingly important part of civilized existence and that the career of a successful scientist is regarded as conferring prestige on his community. The second necessity is that during their professional training in university and clinical school men and women shall have personal contact with teachers, scientific workers and clinicians who can by their own enthusiasm for science kindle the spark in others.

The process of imbuing the community with a sense of the practical value and the intrinsic worth of scientific research is perhaps one of the major social phenomena of the present time. It is highly characteristic of those two contrasting civilizations, the American and the Russian. The prestige advertisements of the great American corporations and Soviet propaganda both make the same claim that only by the application of science can human welfare be assured. Both seem to be effective in their respective countries. I doubt sometimes whether it will

be possible to "sell" science in this way to the average Australian. The driving competitive enthusiasm for personal achievement in America and the equally urgent incentive toward the construction of a new social order in Russia both provide an atmosphere in which science can flourish. Our own middle way of life may in the end prove a better one for the average man, but it is not one that can of itself engender enthusiasm for creative work.

The influence of senior men in the university and hospital in directing the ideas of students toward investigational work will always be of the first importance. I may mention two experiences of my own. In about 1919 or 1920 I heard Orme Masson give a lecture on the periodic table of the elements in the light of Moseley's work on atomic numbers and the early Bohr theory of the atom. It was a new story then, told with Masson's superb clarity, and it opened up a picture that I have never forgotten, both of the coming progress in atomic physics and of the intrinsic delight to be found in a new understanding of things. At the Melbourne Hospital, I was a very young resident medical officer in Sir Richard Stawell's wards. One morning I led him past a patient with the remark: "That's only a pneumonia, sir." I was told what I deserved to be told, and either then or very soon afterwards I began to realize that every patient in the ward was just as interesting a problem as one had the energy and enthusiasm to make him. Stawell's insistence on what he did not know about the nature of a patient's illness—"I don't know, nobody knows"—could be a potent stimulus.

How present-day university teachers with their enormous classes can maintain and pass on to their students their enthusiasm for discovery and new elucidation is a problem both for themselves and for our university administrators. The problem is not quite so difficult in the hospitals where clinical teaching is of necessity a more personal matter, but I think that an even greater stimulus could be given by a few full-time men who could combine clinical teaching with active investigation.

Selection of research workers must always be self-selection, and training must for the most part be self-training. A successful worker has to find somewhere an enthusiasm for his task of discovery and the tenacity to obtain or fashion for himself the tools that he needs to carry it out. It is a great help to be guided in such matters as to how to utilize library facilities, how to acquire a working knowledge of statistics and where to apply for technical guidance on specific points; but if our men are to stand on their own feet they must gain their essential training on the job.

The two requirements, if we are to produce an effective contribution to medical knowledge in Australia, are that we should attract a small but steady proportion of our best graduates to the field of research, and that we should make available to them the opportunity and the financial support they require.

I have so far spoken only of the value of research in a teaching hospital and of the problem of attracting men to at least a temporary sojurn in the research field. I have said nothing of actual research activities.

Medical research can cover an enormous range of subjects, and it may call for the services of men trained in any one of the fundamental or applied sciences. It can be carried out at various levels, from a simple accumulation and analysis of clinical data by a single practitioner to a large-scale organized attack of the type now being turned on to the major medical problems of the war, or to the development by a worker of genius of some totally new approach to medical problems.

There are, however, three main factors which determine the direction of research, medical or non-medical. These are, first, the recognized needs of the community, second, the interests and capacities of the workers concerned, and third, the availability of knowledge and technical methods. Two other factors are the current trends (fashions if you like) in research and the amount of financial support available.

As in every other human activity, successful achievement in research depends mainly on the personal qualities of individual human beings. If Australia is to build up a worthy structure of medical research, the first need is to find and retain men capable of first-rate work. To do so will require that a considerable number of young graduates both in medicine and in the basic medical sciences shall have an opportunity to test their ability for investigational work, that those with the ability and the desire to continue in the field shall receive further training, preferably in overseas centres of research, and finally, that the opportunities in Australia for men of mature experience shall be good enough to counter that gravitational pull to England or America that has been so effective in the past.

No single means is available to meet these requirements. What is needed most is that those responsible for medical training, both preclinical and clinical, shall accept the view that research is a necessary part of the developing tradition of scientific medicine—and that they shall support any move to provide more effective opportunities for training our best young graduates in research methods and that experience in research shall be a factor in determining appointments to clinical teaching posts. Only in this way can a living tradition of scientific activity in our medical schools become established, and until it does become so established the existence of a few senior posts in various medical research laboratories will not be of much value to Australian medicine.

In Melbourne there has been a tradition of research in the medical school since the days of C. J. Martin, and during the last twenty years there has been an increasing output of useful work. This work, however, has on the whole never been close enough to the actual clinical work and teaching of the hospital to provide the stimulus which one feels in the great teaching hospitals of England and America.

I should like to conclude this lecture with some specific suggestions as to how the organization of medical research in this State could be more closely adapted to fulfil its several important functions.

In the first place, it seems urgent that the full-time professional unit should be introduced as the active nucleus of clinical teaching within the hospitals. Each of the general teaching hospitals, the Women's Hospital and the Children's Hospital, should have one or more clinical units headed by a full-time professor responsible both for the general organization of teaching and for the conduct of clinical and associated research in his department. The existing hospital research institutes should eventually become the clinical research laboratories attached to these units. In these laboratories a proportion of fundamental work would be undertaken, but for the most part their activity should be directed toward specifically clinical problems, and the responsible members of the staff should all be medically trained.

The preclinical departments of the university will continue to regard part-time research by the senior members of the staff as an essential part of their duties. These laboratories have the important function of providing preliminary training in research for young graduates in science or medicine, but unless the present teaching responsibilities can be considerably lightened it will be exceptional for them to produce outstanding contributions.

These activities are essentially only an extension and reorganization of existing activities; but there seem to me to be two important gaps that may call for new organizations. One of the necessities is a central institute of medical research, concerned like the National Institute of Medical Research at Hampstead or the Rockefeller and a dozen other institutes in America with fundamental rather than clinical studies. Under Dr. C. H. Kellaway's direction the Walter and Eliza Hall Institute developed largely along these lines, and if eventually new laboratories for departments of medicine and surgery take over the clinical research activities of the Royal Melbourne Hospital, it may be found an acceptable solution to make the Hall Institute such a central institute of medical sciences.

Alternatively, it may be better to separate such an institute wholly from any individual hospital. Eventually I think the National Health and Medical Research Council will need to consider the development of a central research

laboratory where the highly specialized techniques now being applied to medical and biological research can be made available. The logical place for such a development is in association with the Commonwealth Serum Laboratories in Melbourne. Should such a scheme materialize there are certain safeguards which are desirable if the institute is to function in the only way by which its existence can be justified—by producing contributions of first quality to the world's knowledge in medical science. The first essential is that departments and teams must be built up around outstanding men, and not that applicants should be sought to carry out such and such a scheme of research. The second essential is a corollary to the first—namely, that once a man with real ability and enthusiasm has been found, he should be given every opportunity in material and assistance to get all the work done that he can manage. The direction to be taken by his work must depend wholly on his own sense of the way his experimental results are leading him. The politician and the cynic may say that such a policy is an invitation to idleness and a waste of public money. But anyone who has seen at work a competent investigator with a good problem and with the facilities he needs (or better still known the experience himself), will understand how remote from reality such a suggestion is.

The control of any such national institute must be wholly freed from political pressure. Both the university and the hospitals should have a share in its control, and the governing body should include men with personal experience in research.

The second gap in the present organization in Victoria is the lack of active research in the field of pædiatrics and child health. The understanding and successful guidance of childhood is probably more important to the community than any other aspect of medicine. In my own subject I am convinced of the necessity for much wider study of infection in childhood if we are to gain a real understanding of the natural history of infectious disease in man. I fancy that those interested in nutrition and in psychiatry may have very similar views in regard to their subjects. An institute of child health associated with the Children's Hospital and perhaps under the direction of the professor of pædiatrics might well be an early post-war objective. It should, however, have a considerably wider scope than that of a laboratory for clinical research in pædiatrics. When fully developed it should become a centre to which any childhood problem of current importance could be referred, whether of nutrition, infectious disease or behaviour. The institute would require an effective nucleus of staff interested and trained in sociological aspects of medicine as well as men with clinical and scientific training. Here, as elsewhere in the field of research, the need would be to provide facilities for men with ideas and ability rather than to prepare a well-balanced scheme and then seek for the men and women to carry it into effect. There are many organizations, governmental, religious and private, interested in child care of one sort or another, and an institute of the sort I am discussing might be of immense value to these, both as a result of specific *ad hoc* investigations and by formal and informal educational activities. Equally, it would only be by the cooperation of such organizations that the institute could make the field studies necessary for its work.

Conclusion.

These ideas may be unduly ambitious and rather naive, but they seem to me to represent the only type of answer that can be given to the problem with which I opened this discussion on research in Australia. Granted the justification and necessity of active and effective medical research, how are we to attract and retain first-class workers against the gravitational pull to the larger centres overseas? The only solution is to provide opportunities in Australia where such men can find full scope for their abilities, where they can feel that they are doing work whose value is recognized by the community, and where successful work is rewarded by prestige and reasonable financial security. There is no other way of building up a structure of research in and around our medical schools.

If we cannot stimulate and use our best men in these or similar ways, Australian medicine will be in danger of stagnation. The philosophy of "good enough", which has left Australian primary and secondary education so far behind American and British standards, must be kept out of the clinical schools. An active leaven of research will do more than anything to banish it. In Lewis's words, "teaching and research feed upon each other; they grow together establishing in a given school *tradition* which once established brings continuous and lasting fertility".

FOOT COLLAPSE.[1]

By LESLIE J. WOODLAND, M.B., Ch.M. (Sydney), F.R.C.S. (Edinburgh),

Honorary Assistant Orthopædic Surgeon, the Royal Prince Alfred Hospital, Sydney; Honorary Orthopædic Surgeon, the Rachel Forster Hospital for Women and Children; Honorary Assistant Orthopædic Surgeon, Lewisham Hospital; Honorary Assistant Orthopædic Surgeon to the Physiotherapy Department, the Royal Alexandra Hospital for Children.

MY objects in selecting foot collapse as the subject of my paper were, firstly, to stress the unity of functional foot disabilities as one clinical entity, and secondly, to put forward the method of treatment I have adopted.

Foot collapse has been more aptly termed "foot capsize". By foot collapse is meant capsize of the longitudinal arch and of the so-called transverse arch. Classically, this condition is described as separate clinical entities—for example, flat foot, metatarsalgia, splay foot, *hallux valgus*, hammer toes *et cetera*. Whilst it is true that one or other of these disabilities may be found alone, the tendency to the development of the other deformities is present, and they will occur unless treatment is instituted. More commonly, when one first sees the patient all the features of full collapse are present.

To group functional defects as one clinical entity may be deemed dangerous. The foot, however, is an organ of support and propulsion in which, if a static or dynamic defect appears in one part, all other parts are affected and sooner or later collapse occurs. I quite agree that the primary defect must be diligently sought and treated; but the foot must be treated as a whole, and even then only as a part of a weight-bearing and walking mechanism.

Lake,[(1)] although he discounts the association of forepart and hindpart collapse, states that "in an inherently weak foot, prolonged standing will lead to the production of a dropped longitudinal arch, while active occupation will lead to a splay foot with its accompaniments". Hindpart collapse almost invariably leads to full collapse. Forepart collapse, which is the commoner initial collapse, does not always lead to full collapse; but the tendency is there, and help must be provided to prevent it.

I do not wish to convey the impression that a foot is like a house of cards which will collapse on the slightest provocation. If they are not abused unduly, most feet will stand an extraordinary amount of strain. Other feet, however, will collapse even under ideal conditions.

Anatomical and Physiological Considerations.

Ligaments are designed to withstand continuous strain. They are injured and weakened if subject to sudden strain.

One of the functions of muscles is protection. They withstand sudden strains and so prevent injury to the ligaments. A completely paralysed foot will not collapse under normal weight-bearing activity, provided it is protected from sudden strains by the use of double irons in lieu of muscles. The main action of muscles passing from the leg to the foot is to balance the leg on the foot in such a manner that the weight of the body falls on that part of the foot which should be bearing it at that

[1] Read at a meeting of the Orthopædic Section of the New South Wales Branch of the British Medical Association on May 27, 1943.

particular stage of the walking cycle. The actions of the hammock muscles, three invertors and two evertors, are mainly of a controlling nature. The *tendo calcaneous* group is the propulsive agent. There is a common field of tension, of variable extent, but usually of about one-fifth of the range of movement. In this field both agonists and protagonists are active.

The two main sources of weakness in a foot are, firstly, the eccentric position occupied by the talus on the medial side of the calcaneus, and secondly, the instability of the recently acquired approximation of the first metatarsal to the outer four metatarsals.

I shall discuss the hindpart of the foot first. The calcaneus, the main weight-bearing part of the foot, has normally a slight outward slope in relation to the leg. The talus firmly wedged in the tibio-fibular mortice occupies an eccentric position on the medial side of the calcaneus. Normally the line of the centre of gravity through the talus runs from the centre of the heel posteriorly to the first intermetatarsal space anteriorly. Vertical direction of body weight to the talus is very important. If this is not secured, there is an increase in the normal tendency for the tibia and talus to slide medially and downwards, with further increase in eversion of the heel. This tendency of the talus to slide medially and downwards and for the calcaneus to evert, prevents jarring; but it imposes a heavy strain on invertors and ligaments.

The only muscle inserted into the calcaneus is the *tendo calcaneus* group. This muscle has a slight everting action, which is increased the more the calcaneus is everted. The hammock muscles, both invertors and evertors, run from the leg to the forepart of the foot. These muscles influence the calcaneus by their position and are attached to it by their tendon sheaths. They also influence the position of the calcaneus by their action on the forepart of the foot.

The second source of weakness is the first metatarsal unit. The functions of the forepart of the foot are weight-bearing, balance and the giving of a spring to the take-off. At the take-off in the average foot, the outer four metatarsal heads are just off the ground with the toes pointing outward. The forces applied tend to separate the first metatarsal from the others.

Lake[3] has pointed out that the more oblique the line of the metatarsal heads, the more pronounced this tendency, as the spreading force acts for a longer time.

D. J. Morton[3] has shown that in standing, half the body weight is borne by the heel, the other half by the metatarsals. The metatarsals each bear an equal share of the load, except the first metatarsal, which carries twice the load of the others. When the first metatarsal is unstable on account of shortness, hypermobility or wide separation from the second, it will not carry its share of the weight either in standing or in walking. The second and third metatarsals hypertrophy and shoulder more than their share of the load, but are unable to carry on unless kindly treated.

Morton[4] has compared the unstable first metatarsal to a short or loose leg in a chair which promptly capsizes when weight is placed upon it. Insufficiency of the first metatarsal means that the inner front leg of the pedal tripod is not functioning as a satisfactory support, and in consequence the function of the foot as a whole is impaired.

Pathology.

All distortions which occur in foot capsize are opposed by soft structures, chiefly ligaments and muscles. Increased tension occurs in most of the foot and leg muscles. Degenerative arthritis is caused by the altered stress on joints. This further increases muscle spasm, which is followed finally by muscle contractures. Diffuse periarticular fibrosis due to lymphatic stasis and increased tension in the tissues also occurs. Callosities and corns are due to intermittent pressure and occur at the sites of pressure.

Ætiology.

A foot capsizes either because the load is too great, or else because the foot is too weak. Overload may be due to overweight; but it is mainly due to bad distribution of the load. Bow legs, knock knees, *genu recurvatum*, lateral rotation at the hips with toes pointed out, poor posture which leads to the so-called acetabular subtalar dystrochoides or "squinting knees", general atony of muscle which is common in women and becomes more pronounced as age progresses—all these lead to alteration of the line of the centre of gravity, maldistribution of the load, foot strain and subsequent collapse.

A foot may be weakened by general ill health, infection, pregnancy, overwork, lack of use, congenital weakness and bad footwear.

Let us consider the last two factors in more detail. The fact that foot collapse is far more common in women than in men suggests that bad footwear is a more important factor than inherent structural weakness. High heels cause adaptive shortening of the *tendo calcaneus*; but what is more important, they place an undue strain on the commonest site of inherent structural weakness—namely, the forepart of the foot and the first metatarsal in particular. Narrow heels make balance unstable and so place unnecessary strain on the muscles and ligaments of the whole limb. Shoes and stockings which are not perfectly straight on their inner border deflect the great toe. This not only levers the first metatarsal into a varus position, but also weakens the *flexor hallucis longus*, a powerful invertor.

Congenital weakness of the foot may be due to the following causes: (i) the so-called congenital laxity of ligaments, which is really congenital atonia of muscles; the muscles fail in their protective function, and the ligaments are then stretched and become lax; (ii) shortened calf muscles; (iii) the presence of extra naviculars, fused or separate, with associated alteration of insertion of the *tibialis posticus*; (iv) long, narrow feet; (v) backward location of the sesamoids beneath the first metatarsal; (vi) short, flexed, hypermobile or varus first metatarsals.

Causative factors are frequently multiple. In my experience the commonest causes of functional insufficiency are the intrinsic factor of an unstable first metatarsal, and the extrinsic factors of bad footwear, atonia of muscle and bad posture. Any increase in load beyond normal or any decrease in functional capacity of the foot below normal will result in functional decompensation.

Symptoms and Signs.

Symptoms are variable. Pain, aching and cramps may occur anywhere from the tips of the toes to the back. The chief signs of full foot collapse are definite. They are as follows: (i) valgus tilt of the heel; (ii) supination of the forepart of the foot; (iii) splay foot; (iv) *hallux valgus*; (v) contracted toes. I shall endeavour to show how, once any of these signs appear, the other signs can and will follow.

Valgus Tilt of Heel.

"Everted heel" and "pronated heel" are synonymous terms. Normally the heel as viewed from behind is slightly everted. Weakness of the invertors, overaction of the evertors, a tight *tendo calcaneus*—any of these will increase the valgus tilt of the heel. Böhler has shown that fixed supination of the forepart of the foot will invoke compensatory eversion of the heel. When insufficiency of the first metatarsal is present, the inner prop of the forepart of the foot capsizes. This weakening of the inner side of the foot causes the whole foot, including the *os calcis*, to be everted. Valgus tilt of the heel permits the tibia and talus to slide medially and downwards.

Graham[5] has shown that in many cases it is the superstructure that is the primary fault and not the foot. Any alteration of the line of gravity medially will cause the tibia and talus as a unit either to rotate or to slide medially. The calcaneus is everted as the body weight is now carried farther in a medial direction on the supporting shelf of the calcaneus.

Increased valgus tilt of the heel with increased obliquity of the *tendo calcaneus* and prominence of the medial malleolus are the predominant signs of collapse of the hindpart of the foot or flat feet.

Supination of the Forepart of the Foot.

Steindler stressed the fact that supinatory compensatory torsion of the forepart of the foot occurs in all cases of *pes*

valgus. In the earliest stage of functional insufficiency of the hindpart of the foot, supination of the forepart of the foot is due to overaction of the invertors in an effort to correct the valgus tilt of the heel. This is seen quite commonly in children. In other stages when the whole foot is pronated, supination of the forepart is necessary to enable the outer toes to reach the ground. This is brought about by pressure reaction from the ground together with the active contraction of the *tibialis anticus*.

Splay Foot.

In splay foot there is a widening of all intermetatarsal spaces, but particularly of the first space. The whole plantar surface of the forepart of the foot becomes flattened or even convex. This causes pain and callus formation mainly beneath the head of the second metatarsal. Splay foot is due to functional insufficiency of the first metatarsal unit. This insufficiency may be due to congenital defects as enumerated earlier, to overstrain, to incorrect shoes or to collapse of the hindpart of the foot.

When the posterior pillar of the longitudinal arch capsizes, the anterior pillar must of necessity be affected. Dorsiflexion, axial lengthening and hypermobility occur in the forepart of the foot, but particularly in the first metatarsal segment. The normal shearing stress at the push-off stage of the walking cycle is increased when the first metatarsal is unstable.

It has now been established[6] that any actual or relative shortening of the first metatarsal, whether congenital or acquired, will cause splay foot and flat foot.

Hallux Valgus.

I liken *hallux valgus* to a squinting eye. As an eye that is out of balance turns in and ceases to function, so does a great toe. *Hallux valgus* is due to functional insufficiency of the first metatarsal. It is always associated with splay foot. As we have seen, *hallux valgus* will cause splay foot and flat foot, and *vice versa*. *Hallux valgus* is progressive, as the *adductor hallucis*, the extensors and the flexors are now deforming agents.

Contracted or Hammer Toes.

There are very few adult feet in which there is not some degree of contraction of the outer toes. This is probably due to lack of development of the lumbricals and interossei. The position adopted is exactly the same as the "*main en griffe*" of ulnar nerve paralysis.

Toes are not necessary in standing. At the push-off stage of the walking cycle, the metatarsals extend on the phalanges. Lake states that as the roll of the metatarsals occurs, the bases of the toes travel forward. Except in the case of the hallux, the tips only of the toes are in contact with the ground and are relatively fixed. There is thus a constant tendency for the tips and bases of the outer four toes to approximate, with resultant hyperextension at the metatarso-phalangeal joint and flexion at the interphalangeal joint. As in the fingers, when the proximal interphalangeal joints are fixed in flexion, all power of the extensor tendons over the distal interphalangeal joints is lost.

Spasm and increased tension in the long flexors and extensors of the toes, which occur in any foot strain, will increase this tendency to hammer toes.

In splay foot, relative lowering of the metatarsal heads and over-development of the plantar pad increase this tendency. Actual dislocation of the base of the proximal phalanx on the dorsum of the neck of the metatarsal is not uncommon.

Prophylaxis.

The foot is a potentially weak structure at the distal end of the organ of locomotion. Modern civilization, with hard pavements to walk upon, and the necessity for prolonged standing, has imposed a heavy strain on this new evolutionary structure. For the prevention of foot collapse, manufacturers should be allowed to make only correct footwear. As Lake has stated, a correct shoe anticipates the evolutionary trend to a more rigid type of foot.

Essential features of a correct shoe are the following: (i) The heel has a wide base; the height varies from one to two inches according to the sex. (ii) The heel counter fits snugly. (iii) The shank is semi-flexible. (iv) The sole is thick and has a straight inner border. (v) The upper provides firm support for the tarsals and metatarsals. (vi) There is plenty of room for the toes in three dimensions.

Prolonged standing tends to the persistence of the relaxed posture that is of necessity adopted. A person whose occupation entails prolonged standing should be permitted regular rest intervals. In addition, he should be taught to revert to the normal upright position from time to time.

A person with a weak first metatarsal should be taught to carry more of the body weight on the heel whilst standing.

Normal correct walking[7] consists of a light rolling gait. Correct walking is impossible without correct posture. In correct walking the feet point straight ahead, neither inwards nor outwards. The heel strikes the ground first on the outer side. Weight is transferred from the other foot to the outer side of the heel, thence to the outer side of the foot, then across the metatarsals to the head of the first metatarsal mainly. This transference is a screw-like movement, coming from the lateral side and running forwards and medially to the great toe. The habit of lateral rotation of the hips is acquired.

As potential weakness and early deformity are first noticed in adolescence, school inspection should be rigorous. We as a profession cannot be absolved from blame if we do not regard a convalescent patient as a person with atonic muscles, who is prone to foot strain and later foot collapse. There should be complete prohibition of the use of bedroom slippers in hospitals.

Common foot disorders are not purely a matter for orthopædic surgeons. Until all general practitioners and the members of all specialties realize their responsibility, the foot problem will not be solved. When the interest of practitioners is aroused and they realize their own ability to handle the vast majority of these cases, real progress will be made. If this cannot be secured, I hope to see in the "new order" the widespread establishment of foot clinics.

Treatment.

Not only must the foot be treated as a whole, but the whole walking mechanism of which the foot is one part must be treated. Remedial measures are taken to correct posture, and when this is achieved the optimum line of gravity is secured. Rest, manipulation, contrast baths, faradic baths, all are used in order to get the foot into condition for foot and walking exercises. These exercises must be performed twice per day for several months.

The use of a corrective shoe I find a great help. A corrective shoe is a correct shoe to which are added a Hauser bar and a Thomas heel. The function of a corrective shoe is to give active aid in the correction of functional insufficiency of the foot.

At the risk of being over-tedious, I wish to point out that for a correct Thomas or "C. and E." heel, each patient's foot must be measured in four directions. The inner border of the heel is measured from the tip of the *os calcis* to the level of the distal border of the tubercle of the navicular. The distal end of the outer border is a perpendicular line dropped from the anterior border of the external malleolus. The inner side of the heel is raised one-sixteenth to one-quarter of an inch higher than the outer side. An outer "tip" for the heel and the insertion of the wedge between the heel and the upper are refinements.

A Hauser bar is a comma-shaped bar which is placed on the sole obliquely beneath the necks of the metatarsals, from the first to the fourth inclusive. Its width varies from one inch on the inner side to one and a half inches on the outer side. It ends five-eights of an inch from the outer margin of the sole. This means that the fifth metatarsal neck is unsupported. It is allowed to drop and so corns on the little toe are not aggravated. The bar is raised one-eighth to three-eighths of an inch higher on

the outer side than on the inner side. The common specification is one-eighth of an inch high on the inner side, one-third of an inch high on the outer side.

The Thomas heel and the Hauser bar thus form two planes inclined in opposite directions, and separated by about two inches in the adult.

The actions of this shoe are as follows: (i) The valgus tilt of the heel is corrected, and additional support is provided for the talo-navicular joint, especially in standing. (ii) The forepart of the foot is pronated. (iii) The first metatarsal is compelled to take its share of the weight. (iv) The transverse arch is reestablished and the forepart of the foot is narrowed. This shoe is worn continuously for about six months; it is then worn intermittently for a further twelve months. Rarely a patient will say that the shoe is uncomfortable for the first few days; usually complete relief is obtained from the outset.

Occasionally, when a first metatarsal is very inefficient, I use in addition a "platform" on the inner sole beneath the head of the first metatarsal, with or without a metatarsal dome, which is beneath the necks of the metatarsals.

Surgical measures are sometimes used as an adjunct in treatment. Keller's operation for *hallux valgus*, arthrodesis for hammer toes and tenotomies of the long flexor and extensor tendons to the toes are frequently performed. Lengthening of the *tendo calcaneus* with "anterior and posterior tibialis transposition" is performed on relaxed, weak feet.

Removal of the pre-hallux and reinsertion of the *tibialis posticus*[5] are performed when the extra ossicle is present. Surgical measures without treatment of the foot as a whole are unsatisfactory. When severe arthritis is present in the mid-tarsal and subastragaloid joints, I use a Whitman's brace.

References.

(1) N. C. Lake: "The Foot", 1942, page 183.
(2) N. C. Lake: *Ibidem*, page 180.
(3) D. J. Morton: "Foot Disorders in General Practice", *The Journal of the American Medical Association*, Volume CIX, 1937, page 1112.
(4) D. J. Morton: "Functional Disorders of the Foot and their Treatment", *Archives of Physical Therapy*, Volume XXII, November, 1941, page 651.
(5) J. Graham: "Complications of the Weak Foot (Subtalar Dystrochoides)", *The American Journal of Surgery*, Volume XLII, 1938, page 299.
(6) J. Veyrassat and A. Berner: *"Résultats éloignés de l'opération de Hueter dans l'hallux valgus"*, *Schweizer medizinische Wochenschrift*, Volume LXXI, 1941, page 587; cited in "Year Book of Industrial and Orthopædic Surgery", 1941, page 20.
(7) E. D. W. Hauser: "Diseases of the Foot", 1941, page 68.
(8) F. C. Kidner: "The Pre Hallux in Relation to Flat Foot", *The Journal of the American Medical Association*, Volume CI, 1933, page 1539.

ACUTE POLYARTHRITIS IN QUEENSLAND.

By ERIC W. SIBREE,
Captain, Australian Army Medical Corps, Australia.

TWENTY-EIGHT cases of acute polyarthritis occurred in a military unit in Queensland in late February and early March, 1944. The syndrome of painful joints, rash and adenitis and malaise closely resembles the acute polyarthritis among troops in the Northern Territory, described by Halliday and Horan.[3]

Clinical Course.

The course of the condition was usually mild, but a few patients required prolonged treatment. Seventeen of 28 patients were able to carry on in the unit, although some required a modification of normal duty because of painful joints or malaise.

Seven of the eleven patients admitted to hospital were back on duty within a period of eleven to fifteen days from the commencement of the illness. Another patient was unable to return to duty for twenty-three days. Two patients were in hospital for sixty days, and one other is still in hospital after ten weeks. The last four patients mentioned have been retained in hospital because of persistent painful joints, although ultimate cure is expected. Relapse occurred in one case only; the patient was in hospital for about a month and then returned to the unit practically cured. Pain in the joints recurred, and he was returned to hospital within eleven days.

Sequence of Complaints.

Malaise, if present, was usually the first complaint; it was followed in about two days by a rash and by pain in the joints, which appeared simultaneously, or within a day of each other; in the latter case the rash usually preceded the painful joints. Thus, when malaise was not present, the first complaint was usually of a rash, or less commonly of one or more painful joints. When a rash was the initial presenting sign, one or more painful joints also could be found in most cases, or their appearance could be confidently expected within about twenty-four hours.

Painful Joints.

All except seven of the 28 patients complained of painful joints. Of these seven, one man complained of tenderness of the shins and slight weakness of the legs. Joint involvement occurred early and was the last clinical manifestation to disappear. It was usually multiple, two or more joints becoming painful at about the same time, and remaining painful throughout, without subsequent involvement of other joints. Both small and large joints were involved—for example, the metacarpo-phalangeal joints, the wrists, the elbows, the knees and the ankles; there was little if any predilection, except perhaps for ankles and wrists. The spine was not involved except possibly in one case; this patient complained of considerable backache, which may have been due to myalgia.

Aching at rest was not severe, but pain on movement was present, in addition to pronounced localized tenderness over one part of the capsule or ligaments or tendinous insertions surrounding the joints. In some cases tenderness at a tendinous insertion was continued for a short distance along the tendon itself.

Two patients examined in hospital were reported to have had effusions at joints; but this condition was not seen in any other case, nor were other signs of inflammation, such as redness or heat, noticed at any joint. Even in the two cases in which effusion was noticed, good passive movement of the affected joints was possible, and it is likely that the swelling was periarticular. No radiological changes were found in the joints of two patients with joint pains which persisted over two months. Two of the three patients whose joint pains lasted for two months were completely apyrexial, and the third showed pyrexia on only one occasion.

Rash.

In 19 of the 28 cases a rash developed; it was usually first noticed by the patient on the flexor surfaces of the forearms or on the abdomen. At this early stage, some patients complained of tingling and hypersensitivity of the tips of the fingers and less frequently of the toes. On inspection, the rash was found to be widespread over the whole skin surface, or it rapidly became so. No particular skin area was found to be commonly involved early. Even in the early stages, the rash consisted of small, discrete, pink papules. The papules became pronounced within twelve hours, being an inch to two inches apart except at the extensor surfaces of the elbows and knees, where they were closely packed with some tendency to confluence. Otherwise, confluence was noticed in only two cases, in both of which small confluent areas were present on the face. The appearance of the rash was modified in the palms and on the soles and on the tips of the fingers and toes, where it showed as small pink dots.

The rash remained as described for its whole duration, usually three to eight days, gradually fading without desquamation. On the boot areas of ambulatory patients the rash was very pronounced, and this was the last

area from which it faded. The rash was occasionally associated with a slight general skin irritation. A complaint of tingling and hypersensitivity or soreness in the tips of the fingers was frequently found; sometimes the tingling and hypersensitivity affected the toes and to a less extent the palms and soles and tips of the ears.

Atypical Rash.—Frequently the rash was not so characteristic as the typical exanthem described above. Sometimes it was less generalized in its onset and later distribution and faded within two days; moreover, instead of being distinctly papular, in some cases it was maculopapular or almost wholly macular, and the pinkness of the lesions was less pronounced. In one case in hospital considerable intradermal œdema and generalized bright efflorescence were present. In three cases vesicles developed during the stay in hospital, and in two of these the lesion was suspected of being varicella.

Adenitis.

The exact frequency of occurrence of superficial adenitis was not determined. Adenitis is known to have been present in eleven cases, although in two of these only one or two glands were involved.

Malaise.

There was a remarkable absence of severe constitutional disturbance. Even in hospital cases apyrexia was the rule, and when pyrexia did occur in no case did the temperature exceed 101·4° F.; in only three cases was the temperature at any time as high as 101° F. The longest duration of fever was eight days.

Special Investigations.

Leucocyte counts of five patients were within normal limits. The sedimentation rates in the first hour of three patients with the most persistent joint conditions were as follows: Case V: 4, 2, 1 (on the sixth, twentieth and forty-sixth days of illness respectively); Case XII: 8, 7 (on the third and seventeenth days of illness respectively); Case III: 10, 5 (on the fourth and thirteenth days of illness respectively) and 19 (on the sixth day after readmission to hospital for gradual relapse). The normal figures in Case V are interesting. The figures in Case XII and especially in Case III are raised, and in Case III there is evidence of the exacerbation of an inflammatory reaction consistent with the clinical relapse.

Similar Cases in Other Units.

Three other cases of the disease under discussion were seen in the two military hospitals serving this area, and a few cases may have occurred in other units, although admission to hospital was not necessary. Each of the three cases occurred at about the same time as the epidemic under discussion, and each patient was from a different unit.

Differential Diagnosis.

Dengue Fever.

Care must be exercised in the differentiation of acute polyarthritis from dengue fever in an area in which dengue fever is endemic, because of the protean nature of the latter and because of the presence of characteristics common to both conditions. It is probable that dengue fever patients may be afebrile or mildly febrile. Joint pains may occur as periarthritis, especially at tendon insertions, and such pains may be persistent. The secondary or terminal rash of dengue fever is variously described as resembling measles or as being maculo-papular, and it may be generalized, and of variable duration. The terminal rash is described as commencing as isolated, slightly elevated, circular, reddish-brown, rubeoloid spots, with a tendency to coalescence later, and the rash may be visible for three weeks. A papular terminal rash, which may go on to vesiculation, is also described. Superficial adenitis is variable.

The symptoms of dengue fever, which it shares with acute polyarthritis, do not represent dengue fever as a clinical entity. Dengue fever is dissimilar from acute polyarthritis. Amongst the typical features of dengue fever, which differentiate it from acute polyarthritis, the following may be mentioned: sudden onset of moderate or high temperature, lasting about five days; remission of fever and symptoms ("saddle back" chart), anorexia and feeling of misery; pronounced headache, aching eyes and aching of back and limbs; conjunctival congestion; early erythema and lateness of rash; bradycardia; leucopenia with relative reduction in the number of neutrophile leucocytes; mental depression during convalescence.

It seems reasonable to conclude that acute polyarthritis and dengue fever are separate diseases. Individual cases may cause some confusion, but consideration of the characteristics of both diseases should aid differentiation.

Glandular Fever.

Glandular fever is readily excluded.

Rheumatic Fever.

Some of the patients were at first suspected in hospital of suffering from rheumatic fever. Acute polyarthritis is not likely to be confused with acute rheumatic fever because of the absence of high pyrexia, rapid pulse, sweating and cardiac complications, and the presence of characteristic rash and adenitis.

Rubella.

The rash in some of the cases of acute polyarthritis was suggestive of German measles. The similarity may be increased by the frequent absence or the mildness of general reaction in both diseases, and by the presence of mild adenitis. While typical cases may be differentiated by the rash and its onset, spread, duration and nature, atypical cases may be differentiated perhaps only by the characteristic joint pains of polyarthritis. The conjunctival congestion common to German measles is absent in polyarthritis.

Varicella.

Two patients admitted to hospital with an unusual vesiculation of the rash were at first suspected as suffering from chicken pox.

Discussion.

The cases described appear to be examples of the acute polyarthritis described by Halliday and Horan[1] amongst troops in the Northern Territory in late 1942 and early 1943. The main characteristics of both outbreaks are the same—namely, the absence of severe constitutional disturbance, the presence of painful joints, rash and adenitis, the course of the illness and the occurrence of both outbreaks as epidemic amongst troops in subtropical areas.

Dr. C. H. Knott, who has been in practice for some years in the general area in which the recent epidemic occurred, informs me that in about 1940 there was a fairly widespread epidemic, generally considered to be of German measles, which affected this locality. It lasted for some months and involved a fairly large percentage of the scattered civilian population. The general course of the disease was benign, patients with more than a mild pyrexia being uncommon and the majority being apyrexial. A rash resembling rubella appeared in most cases, and some adenitis occurred. The chief point of interest was the frequent occurrence of painful joints, which in some cases persisted for two months or more. Apart from this epidemic, at least one civilian patient with painful joints and rash was seen at about the same time as the small epidemic in this unit, the case occurring out of the immediate training area of this unit.

While the general nature of the epidemic described in the civilian population is consistent with a diagnosis of rubella, yet the frequent appearance of painful joints with a tendency to considerable persistence of pain does not fit into the clinical picture of rubella.

Observations Concerning Possible Ætiology.

The cases in this unit were spread widely throughout its personnel; there was practically no grouping of cases attributable to contact or to messing arrangements or living quarters. The onset of cases was spread over

fifteen days. Unless the incubation period of the disease varied considerably, the infection must also have been spread over at least a week. The camp area of the unit is the only site in which all patients could have been exposed to infection over such a period. Culicine mosquitoes occur in the camp where scrub mites and ticks are absent. The Northern Territory epidemic occurred in a culiciine area, and it seems that the epidemic spread of this disease, with the possibility of underlying low endemicity and the general clinical course, are both similar to the common virus diseases of dengue fever, rubella and varicella.

Summary.

1. A report is given of a series of 28 cases of acute polyarthritis which occurred as a small epidemic in a military unit in Queensland in late February and early March, 1944.

2. The condition was characterized by a mild acute course with absence of severe constitutional disturbance, by frequent absence of pyrexia, and by painful joints, rash and adenitis.

3. Frequently a temporary disability from painful joints occurred, which in a few cases persisted for more than two months.

4. The disease appears to be identical with acute polyarthritis as described by Halliday and Horan in the Northern Territory.

5. Acute polyarthritis has previously occurred in Queensland in epidemic and possibly endemic forms.

Acknowledgements.

The Director-General of Medical Services, Major-General S. R. Burston, has kindly given permission to publish this report.

Reference.

(1) J. H. Halliday and J. P. Horan: "An Epidemic of Polyarthritis in the Northern Territory", THE MEDICAL JOURNAL OF AUSTRALIA, Volume II, October 9, 1943, page 293.

A STATISTICAL SURVEY OF APPENDICITIS IN CHILDREN.[1]

By S. G. ANDERSON, M.B., B.S.,
Registrar, Children's Hospital, Melbourne.

THE figures in this review are abstracted from records at the Children's Hospital, Melbourne, and are concerned only with those cases of appendicitis proved at operation or *post mortem*. Fifty-five patients under the age of three years were admitted to the hospital between July, 1931, and June, 1943; and 878 patients between the ages of three years and fourteen years were admitted to hospital during the five-year period terminating in June, 1943. A few cases were not included because the available histories were not adequate for the purpose of this survey.

It is difficult to decide from records the exact state of a peritoneum, the local indications for drainage of an abdomen and many other details which are important; but the following figures (Table I) are as nearly representative of facts as it has been possible to make them, so long after the records were written.

Children Aged Over Three Years.

The proportion of cases complicated by abscess formation or peritonitis was greater in the earlier years of life; this complication supervened in over 30% of patients aged under six years. It may be noted that twelve patients who had developed peritoneal abscess or general peritonitis, and 103 patients suffering from acute appendicitis, registered normal temperatures. The temperature of a patient with pus in the abdomen was on the average 2° F. higher than that of a patient suffering from simple acute appendicitis.

[1] Read at a meeting of the Melbourne Paediatric Society on November 17, 1943.

TABLE I.
Age Incidence in Children Aged Over Three Years.

Age in Years.	Number of Patients.
3 to 4	23
4 to 5	38
5 to 6	30
6 to 7	41
7 to 8	62
8 to 9	67
9 to 10	99
10 to 11	126
11 to 12	132
12 to 13	126
13 to 14	134
Total	878

TABLE II.

Temperature. (Fahrenheit.)	Number of Patients.
Under 99°	115
99° to 100°	254
100° to 101°	215
101° to 102°	146
102° to 103°	71
103° to 104°	36
104° to 105°	1
Total	838

Position of the Appendix.

Of the 878 cases, in 378 the position occupied by the appendix was recorded; it was retrocaecal or paracaecal in 200 cases, it lay over the pelvic brim in 162 cases and it pointed towards the umbilicus in 16 cases; in 500 cases no mention was made of the position of the appendix.

Convalescence.

It was decided arbitrarily that over ten days was an excessive time to convalesce in hospital. Of the 878 patients, 292 (32%) were in hospital for more than ten days, and 562 (65%) were in hospital for less than ten days; 24 patients (3%) died. Normal convalescence was exceeded in 292 cases, for the following reasons: infection of the wound with discharge of pus, 243 cases (83%); factors other than wound infection (these included mainly bronchopneumonia, pelvic abscess and pyelitis), 49 cases (17%).

Wound Infection.

Possible causes of wound infection were considered, and 185 consecutive cases in which this complication occurred were reviewed. In the great majority of these (153) frank pus was found in the peritoneal cavity at operation.

In 17 of the 32 cases without pus, much free fluid of an apparently non-purulent nature was present in the peritoneal cavity at operation. Drainage of the abdomen through the wound was instituted and the wound became infected with subsequent discharge of pus. This is in contrast to dozens of cases in which such non-purulent fluid was seen at operation, but the abdomen was closed without drainage and without subsequent wound infection or residual abscess formation.

In the 32 cases in which no pus was found at operation, free fluid drained in 17, in six gangrenous appendiceal tissue was found, but no pus in the peritoneum was recorded, and in nine no abnormality beyond acute appendicitis was found.

Attention was given to the records of all cases of appendicitis during the five-year period, in which frank pus was observed at operation, and a comparison was made between the incidence of wound infection and the manner of drainage of the abdomen at operation. The smallest percentage of wound infection was credited to the series

of cases in which the abdomen was closed without any drainage; in some of these cases a rubber drain was inserted under the external oblique tendon. In a few cases, sulphonamide drugs were administered either locally or orally, but in the small number of cases recorded before July, 1943, the results of such therapy did not seem conclusive.

TABLE III.

Method of Drainage.	Number of Wounds Infected.	Number of Wounds Not Infected.
Loin stab wound	26	14 (35%)
Suprapubic stab wound	50	17 (25%)
Through McBurney incision	103	8 (7%)
Through loin and suprapubic stab wounds	6	0
	185	39 (17%)
No drainage of abdomen	28	26 (48%)
Total	213	65

Mortality Rate.

Of the 878 patients 24 died, a mortality rate of 3%. Twenty-two of these deaths occurred in cases complicated by peritonitis or appendiceal abscess. The mortality rate apparently bore no relation to the manner of drainage or lack of drainage of the abdomen.

Children Under Three Years.

Fifty-five cases occurred during the twelve-year period from July, 1931, to June, 1943; in 41 of them pus was found in the peritoneal cavity.

Temperature.

The range of rectal temperatures of these 41 patients is shown; 28 of them recorded temperatures over 102° F.

TABLE IV.

Temperature. (Fahrenheit.)	Number of Patients.
Less than 99°	1
99° to 100°	2
100° to 101°	4
101° to 102°	6
102° to 103°	11
103° to 104°	15
104°	2
Total	41

Symptom Sequences.

In 38 cases the sequence of symptoms as given explicitly by the parents was recorded as follows: pain followed by vomiting, nine cases; vomiting followed by pain, 25 cases; pain and vomiting simultaneously, four cases. This preponderance of cases in which, according to the parents, vomiting was the first symptom or sign, did not occur in the histories of children over three years of age.

Mortality Rate.

Among 41 cases complicated by peritonitis or abscess formation, there were 13 patients aged under two years, and eight of them died; of the remaining 28 children aged over two but under three years, eight died.

Among 14 children aged under three years, suffering from simple acute appendicitis, there was no death; three of these children were aged under two years.

An effort was made to determine from the records the possible operative circumstances affecting the mortality rate in cases of peritonitis and peritoneal abscess. These cases were divided for this purpose into two groups. In the first group, in which operation disclosed no adhesions and little or no localizing of infection, four of the eleven patients died. In the second group, in which operation disclosed that localization to the right iliac fossa had occurred preoperatively, or at least that some substantial effort at walling off of the infective process by either œdematous omentum or matted bowel had occurred, there were 18 cases.

In nine of these 18 cases some difficulty was experienced in removing the appendix, and accidental disturbance of localizing barriers inevitably occurred; in six of these nine cases the patient died.

In the remaining nine cases, the operative disturbance was minimal, and in two cases, in order to disturb the field as little as possible, the appendix was left *in situ* and the surrounding region was drained. These nine patients survived. With regard to the remaining 12 cases, it was too difficult to determine from the histories in which of these groups they should be placed.

Acknowledgements.

I should like to thank Dr. Eric E. Price and Dr. Henry J. Sinn for their encouragement and advice.

Reports of Cases.

REPEATED PERICARDOTOMY IN A CASE OF NON-PURULENT PERICARDIAL EFFUSION.

By GORDON V. STANTON,
Flight Lieutenant, Royal Australian Air Force.

THE following case is reported because of several interesting points, which include (i) the mistaken diagnosis, (ii) the treatment, which necessitated repeated open drainage for a non-purulent pericardial effusion, and (iii) the possible ætiology of the effusion.

Clinical Record.

A.C.2 G.G., an aircrew trainee, aged eighteen years and six months, was admitted to his unit sick quarters on December 5, 1943, with a diagnosis of influenza. He had no history of any previous serious illness. During the week prior to his admission to hospital he had had a common cold and what was called "an anaphylactic food reaction", which responded to a hypodermic injection of adrenaline. He complained of pain in the chest made worse by deep breathing and by coughing. On examination, he was found to have a temperature of 103° F., the pulse rate was 110 per minute and the respirations numbered 26 per minute. The *alæ nasi* were working and the lips were cyanosed. No other positive signs were elicited. At 6 p.m. on the same day his temperature and respiratory rate were further elevated. A provisional diagnosis of early left basal pneumonia was made, and the patient was given "M & B 693", three grammes *statim* and one gramme every four hours.

On December 6 the chest was clinically normal except for occasional crepitations at the base of the left lung. The diagnosis of pneumonia was doubted, but the patient continued to receive sulphapyridine therapy. In the evening he complained of a stabbing pain at the left lower border of the sternum. Examination of this area revealed flat dulness to percussion and a friction rub, but no breath sounds. The patient was transferred to a base hospital, where he was admitted with a diagnosis of left basal pneumonia. Sulphapyridine therapy was continued, one gramme being given every four hours. Morphine (0·25 grain) and oxygen were given as required.

By December 9 there had been no response to sulphapyridine therapy, and toxic symptoms were pronounced. Examination of the blood revealed that the hæmoglobin value was 11·5 grammes per 100 millilitres, and that the leucocytes numbered 28,000 per cubic millimetre and the erythrocytes 3,400,000 per cubic millimetre. On December 10 the following abnormalities were noted: the apex beat could be felt and there was a pronounced exocardial rub over a small area at the lower left border of the sternum, where the pain was greatest; the blood pressure was low, the systolic pressure being 100 millimetres of mercury and the diastolic pressure 70. The movement of the left side of the

chest was diminished, the percussion note was dull, and air entry was poor at the bases of both lungs; amphoric breathing was heard at the lower border of the left scapula. On examination, the patient was found to have a temperature of 101° F., his pulse rate was 114 per minute and the respirations numbered 32 per minute. Examination of the blood revealed that the leucocytes numbered 33,000 per cubic millimetre. The sulphapyridine blood level was 11 milligrammes *per centum*. The findings suggested pericarditis and pleural effusion, but an X-ray film taken on a portable machine revealed a pericardial effusion and very little evidence of pulmonary congestion (Figure I). Squadron-

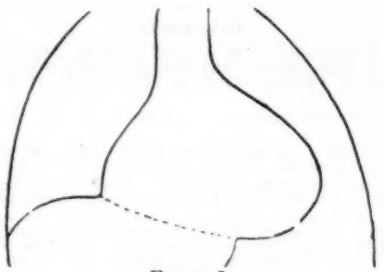


FIGURE I.

Leader H. Lucraft then examined the patient and recommended aspiration of the pericardial effusion, because the pronounced leucocytosis suggested the possibility of its being purulent. Aspiration through the fifth intercostal space and below the subcostal margin produced only one ounce of blood-stained fluid, examination of which revealed moderate numbers of red blood cells and occasional polymorphonuclear leucocytes, but no organisms. Subsequent attempted culture from the fluid produced no growth of organisms.

On December 11 the patient was delirious. Generalized distension of the abdomen was noted, a morbilliform rash was present over the trunk and there was a painless swelling of the right wrist. The heart sounds were the same as previously. His temperature was 102° F., his pulse rate 120 per minute. The blood pressure was typically low, the systolic pressure being 95 millimetres of mercury and the diastolic pressure 50. Examination of the blood revealed 15,000 leucocytes per cubic millimetre. The sulphapyridine blood level was 12 milligrammes *per centum*.

On December 12 the rash was more pronounced and "M & B 760", one gramme every four hours, was substituted for "M & B 693". On December 13 sodium salicylate therapy was combined with the sulphathiazole treatment. Repeated X-ray examination of the chest revealed an apparent further increase of the transverse diameter of the cardiac shadow. Major J. P. Ainslie was consulted, and he advised open drainage in preference to repeated aspiration. The pyrexia, dyspnœa and tachycardia associated with early heart failure were persistent.

Pericardotomy was performed on December 16, whilst the patient was in bed in a semi-Fowler's position. After infiltration with a local anæsthetic agent, portions of the sixth and seventh ribs and costal cartilages were removed. The pericardial sac was exposed, aspirated, then opened. No fluid was encountered anterior to the heart, but when a catheter was passed posteriorly one pint of serosanguineous fluid was removed. A small wick drain was left down to the pericardial opening and the chest wall was closed in layers. The operative procedure was similar to that described by Donaldson[1] for purulent pericardial effusions. All drugs except morphine and oxygen given intranasally were discontinued after operation. The patient was turned into the semi-prone position only twice, because of the great distress occasioned by it, and because of the absence of any considerable drainage resulting from this procedure.

General improvement occurred for the three days after operation; the heart sounds were louder and the pericardial rub was less pronounced, but the pyrexia and tachycardia persisted. Examination of the pericardial fluid revealed occasional polymorphonuclear leucocytes, but no organisms. On December 20 the patient's condition deteriorated. Œdema of the scrotum and sacral area occurred for the first time. X-ray examination revealed a further increase in the size of the heart shadow and air in the left pleural cavity. A course of "M & B 760" was recommenced and *digitalis folia* was given. On December 21, because of the cardiac tamponade (as shown by signs of heart failure and typically low blood pressure), the patient was given 1·5 grammes of a 2·5% solution of "Pentothal", the wound was reopened and 22 ounces of straw-coloured fluid were removed. The wound was dusted with sulphonamide powder and a small catheter was left tied in down to the opening of the pericardial sac. During the operation the patient's pulse varied from 130 to 136 beats per minute and he was considered a "poor risk" by the anæsthetist.

On December 22 the X-ray film (Figure II) taken after drainage revealed no appreciable change in the size of the heart shadow. The catheter was irrigated with sulphonamide

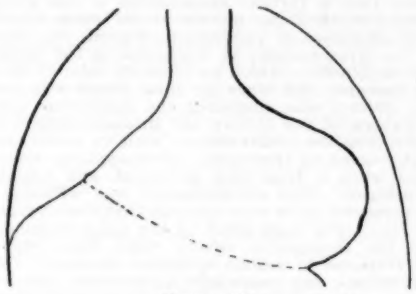


FIGURE II.

solution, but as the return was negligible it was removed after forty-eight hours. On December 23 examination of the pericardial fluid again revealed no organisms, and as two attempts at blood culture on December 13 and 25 gave negative results, it was considered that the pyrexia might have been due to "sulphonamide fever", so the "M & B 693" therapy was discontinued.

On December 27 the pyrexia and tachycardia persisted in spite of general improvement. The œdema had subsided and breathlessness was no longer present. The heart sounds were now clear except for a soft systolic bruit at the apex. Sodium salicylate therapy was again commenced, and on December 31 the temperature was less than 100° F. for the first time since the onset of the disease, and it has remained normal ever since. Coincidentally with this improvement the X-ray film of the chest revealed a remarkable change from the previous examination. The right side of the heart shadow was now within normal limits, but there was very little change in that of the left side of the heart. Digitalis (one grain twice a day) and iron were given.

On January 21, 1944, an electrocardiogram revealed inverted *T*1 and *T*3 waves. X-ray films taken on February 18 and March 21 revealed further diminution of the cardiac shadows. On April 9 a pronounced pulse response to exercise was present, and a further course of sodium salicylate treatment was given. An X-ray film taken on April 19 (Figure III) revealed further improvement. On May 13 an

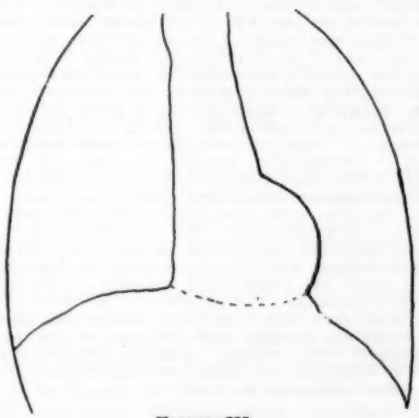


FIGURE III.

electrocardiogram showed that there had been a slight axis shift to the left, the *T*1 wave now being upright and the *T*3 wave inverted. On May 23 an X-ray picture of the chest revealed further improvement, but still some left cardiac

preponderance. The patient's resting pulse rate was between 80 and 90 beats per minute; his sleeping pulse rate was between 70 and 80 beats per minute. His blood pressure is now 120 millimetres of mercury, systolic, and 80 millimetres, diastolic. An apical systolic bruit has persisted. Graduated exercises have now been commenced.

Discussion.

1. With regard to the diagnosis of pericardial effusion, an incorrect initial diagnosis was made in this case, and it was because of the lack of response to routine therapy for pneumonia that a further examination of the patient was made, and that an X-ray picture of the chest, which established the diagnosis of pericardial effusion, was taken. In view of the large number of leucocytes in the blood (33,000 per cubic millimetre), which persisted in spite of the sulphapyridine therapy, and since no lung lesion was present, a purulent effusion was suspected and aspiration was undertaken. Review of the history and findings suggest that the pericarditis was the initial disease with an acute onset.

2. With regard to treatment, sulphapyridine therapy was suspended when a drug rash developed, and sulphathiazole was substituted. The sulphathiazole was withdrawn when pyrexia persisted, as it was thought that the pyrexia was a "drug fever". The toxic effect of the sulphonamide therapy exceeded the therapeutic effects, while there was a pronounced response to sodium salicylate therapy. The initial pericardicentesis was performed to establish the nature of the effusion. Open drainage of a non-purulent effusion was first undertaken when signs of early cardiac failure were associated with toxæmia. The pericardotomy was repeated when cardiac tamponade persisted, as shown by signs of congestive heart failure and low blood pressure. When the pericardial sac was first opened no fluid was apparent, but when a catheter was passed behind the heart, twenty ounces of serosanguineous fluid were removed. On this point Lewis[2] makes the following statement: "The presence of a rub does not exclude effusion or even large effusion, for the heart is often maintained in contact with the anterior parietal pericardium in these circumstances." This explains the failure to aspirate more than one ounce of pericardial fluid through the anterior chest wall. Repeated aspiration is not without danger to the underlying myocardium, whilst aspiration posteriorly may cause trauma and infection of the lungs. On the question of open drainage, J. K. Donaldson[1] states a case for open incision of the pericardial cavity for non-purulent effusions. He reports four patients (six operations) suffering from cardiac tamponade due to non-purulent effusions, who were relieved by open incisions without the occurrence of secondary infection within the pericardial cavity.

3. The possible ætiology of the effusion is of interest. The first pericardial fluid removed was blood-stained, the next serosanguineous, and the last straw-coloured. Puncture of the myocardium at the first aspiration would account for these findings. The reasons for regarding the lesion as non-tuberculous are as follows: (i) Tubercle bacilli could not be grown from the pericardial fluid. However, on this point S. Suzman[3] states that "in spite of negative guinea-pig tests on two occasions, the diagnosis of tuberculous pericardial disease was made". (ii) No evidence of pulmonary tuberculosis was to be found in the X-ray film which was taken on the patient's enlistment or in all subsequent films. However, on this point Heimann and Bender[4] make the following statement: "In reviewing a large series of cases of tuberculous pericarditis the feature of these cases was the absence of signs of pulmonary tuberculosis in most instances." Wendkos[5] reports a case of lymphatic leuchæmia which appeared initially to be a case of massive pericardial effusion simulating the tuberculous variety. However, in this case the blood films did not suggest leuchæmia. Although there was no history of rheumatic fever, and although the routine X-ray film taken on the patient's enlistment four months prior to the illness revealed a normal heart, the most likely ætiology of the pericardial effusion is rheumatic. The presence of a sterile pericardial effusion and pronounced pyrexia which did respond to sodium salicylate therapy and drainage of the pericardial cavity support this opinion. Finally, Lewis[2] states that "very large effusions are usually chronic, often tuberculous, more often of unknown ætiology".

Summary.

1. A case is recorded of pericarditis with massive non-purulent effusion producing cardiac tamponade, which was successfully treated by repeated pericardotomy and sodium salicylate therapy, after sulphonamide therapy and pericardicentesis had failed.

2. The inability to aspirate a massive pericardial effusion through the anterior chest wall is explained.

Acknowledgements.

Acknowledgements are due to Major J. P. Ainslie for the successful surgical intervention, to Squadron-Leader H. S. Lucraft and Squadron-Leader M. B. Robinson for their many valuable consultations, and to Major Elsie Abrahams for the many pathological investigations. I am indebted to the Director-General of Medical Services, Royal Australian Air Force, Air Vice-Marshal T. E. V. Hurley, C.M.G., V.D., who has given permission to publish this article.

References.

(1) J. K. Donaldson: "The Surgical Approach for Incision and Drainage of Non-purulent and Purulent Pericardial Effusions", *The Journal of Thoracic Surgery*, Volume XII, February, 1943, page 209.

(2) T. Lewis: "Pericarditis", "Diseases of the Heart", 1942, page 172.

(3) S. Suzman: "Tuberculous Pericardial Effusion", *The British Heart Journal*, Volume V, January, 1943, page 19.

(4) H. L. Heimann and S. Bender: "Tuberculous Pericarditis", *The British Heart Journal*, Volume II, July, 1940, page 165.

(5) M. H. Wendkos: "Leucæmic Pericarditis: Report of Case of Lymphatic Leucæmia in which Massive Pericardial Effusion was Earliest and Most Outstanding Manifestation", *The American Heart Journal*, Volume XXII, 1941, page 417.

Reviews.

ENDOCRINOLOGY.

THE second English edition of Hermann Zondek's book, "Diseases of the Endocrine Glands", follows the same general plan as the first edition.[1] It is altered and expanded to contain such recent advances as the exigencies of wartime research have permitted. This book contains a vast quantity of material, which is presented from a point of view that is neither completely physiological nor completely clinical. There are difficulties in such an approach to a subject so full of complexity. The author does not always commit himself with regard to the opinions and findings of others, thus leaving the way open to the reader to formulate his own ideas. But without recourse to dogmatism one would welcome a more definite attempt from a recognized authority to integrate the scientific data, the clinical observations and the working hypotheses that are gathered in such abundance in these pages. The book is not one for students of junior grade, but of definite value to the physician. It is perhaps inevitable that this book, like others on endocrinology, should be least strong on the therapeutic side. Even in so closely studied a subject as Graves's disease, for example, perusal of the literature would give no really clear or generally agreed directions as to the exact part played by iodine in treatment. Actually Zondek discusses this topic in considerable detail, though Australian thought, so definitely surgical in outlook on toxic goitre, might consider him not radical enough. We should like to see the hazards of progressive exophthalmos and the course of the parathyreoid complications after operation more explicitly handled.

Again, when we essay to interfere with such a complicated mechanism as sex hormonal balance there are pitfalls, and guidance would be welcome as to the possible effects of stimulation or inhibition of other glandular links in the faulty chain. All the facts relevant to such questions are in this book, but perhaps the master assumes that the clinical pupil assigns them to their appropriate place in making a diagnosis or in planning treatment as readily as he.

Nobody interested in endocrine disease would fail to find valuable information and stimulation in these pages of closely packed material freely interspersed with references to the original sources. There is a full bibliography, the experimental side being very fully represented. The book is profusely illustrated and excellently produced; in fact the war economy standard to which it conforms has in no way detracted from its high technical quality.

[1] "The Diseases of the Endocrine Glands", by Hermann Zondek, M.D. (Berlin), translated by Carl Prausnitz Giles, M.D. (Breslau), M.R.C.S. (England), L.R.C.P. (London); Fourth (Second English) Edition; 1944. London: Edward Arnold and Company. 9" × 5", pp. 504, with illustrations. Price: 40s. net.

The Medical Journal of Australia

SATURDAY, NOVEMBER 25, 1944.

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CANCER AND "H 11".

EVERY now and again a great ado is made in the newspapers about a "cure" for cancer. This is called "news". To people who are in good health the announcement is a matter of interest and little more—they do not necessarily accept the statement as true, and if they do, it does not matter much to them personally. To anyone suffering from a malignant growth, especially in the advanced stages, the new discovery appears at once to offer an anchorage, a hope for the future. When this hope is not realized, then the sufferer is indeed sick at heart and the cruelty of the unjustified enthusiasm first displayed becomes apparent. Non-medical persons do not always appreciate the healthy scepticism of the trained scientific investigator or the need for the control and confirmation of findings, with the meticulous sifting of evidence, when a method or a preparation to be used in the treatment of men and women is in question. Unfortunately this statement is sometimes true also of the less careful among those who have received a medical training. If it were possible to give to the public and to those whose duty it is to inform them on these matters the proper attitude towards new discoveries, medical practitioners in Australia would not at the present time be receiving requests from patients afflicted with cancer for treatment with the remedy known as "H 11". Both in England, where the substance originated, and in America grave warnings have been issued that the clinical use of the remedy is at present unwarranted and that false hopes will be raised if it is used. The time has come for a similar warning to be given in Australia.

In 1941 J. H. Thompson, who is a graduate in science and Director of Research in the Hosa Research Laboratories, Sunbury-on-Thames, published a preliminary account of "H 11", and, to quote H. A. Kidd in the *British Medical Journal* of July 17, 1943, "described not only its biological properties and anticarcinogenic action in transplanted animal tumours, but also its inhibitory effect on human cancer". The only paper by Thompson that is available is a reprint of an article on "H 11" from *King's College Hospital Gazette*, of June, 1943. In this article he describes "H 11" extract as a preparation of growth-inhibiting substances found in normal adult urine. He adds that with one exception these substances have not been identified chemically, but that it is believed that they originate within the endocrine system. According to Thompson there is pharmacological evidence that "H 11" extract contains growth-inhibiting substances similar to those secreted by the parathyreoid glands. Three "somewhat unusual pharmacodynamical properties" are possessed by extracts of parathyreoid glands which have been deprived of the blood calcium raising factor, and by "H 11"; they are inhibition of growth, reduction of body temperature and stimulation of lachrymal and salivary glands in animals. Further, similar chemical processes, applied to either parathyreoid glands or urine, yield extracts possessing similar properties when injected into the circulation. Thompson holds that these growth inhibitors are probably responsible for physiological cessation of growth. When they are injected into animals and human patients they have an effect, he declares, on abnormal growth such as carcinoma, which is inhibited and eventually regresses. Benign growths such as lipomata also regress when treated with "H 11". "This is to be expected on the physiological basis of the therapy." At the same time repair processes are not affected and incisions made during a course of "H 11" therapy heal in a normal way. This is a curiously selective action for an extract which is concerned with normal growth-inhibition. It has been pointed out that if "H 11" is concerned with the inhibition of growth in general, patients who receive hundreds of injections of the substance, as those treated by "H 11" often do, would show some signs of interference with normal growth. As far as can be gathered, no explanation of this point has been offered. It is interesting to note Thompson's statement that the use of deep X-ray therapy and surgery in combination with "H 11" is indicated. This is an admission that inhibition of growth is not alone sufficient to cause regression of a cancerous growth, but such a failure need not necessarily be held as making Thompson's views untenable. What must be remembered is that a cell which becomes cancerous undergoes some change that enables it to take on a disorderly, a new, kind of growth. This means that it has either cast off certain laws of restraint or become subject to new laws; its state cannot be described as completely lawless, for cancers of different types develop and spread in recognized ways. Thompson's ideas are incompatible with these views of the activities of cancer cells.

But the practical side of the subject must be considered. Here we must remember Thompson's claim that "H 11" causes regression of carcinoma in both animals and man. First of all it should perhaps be stated, however, that Thompson has declared that no claim for "cancer cure" has ever been made by him and his fellow workers. The term has been used in the title of the present article for the reason that the public who ask about the treatment always speak of a cure. The report first to be mentioned is that of E. Cronin Lowe, honorary pathologist of the Southport Infirmary, England, and published in *The Medical World* of January 7, 1944. The article is a review of 243 cases of cancer in which "H 11" therapy was used. Lowe was asked to review and report upon the accumulated clinical data at the Hosa Research Laboratories. The

reports came from 204 different doctors and the patients comprised those whose growths were inoperable or were unsuitable for or resistant to radiological treatment. In short, the clinical outlook was hopeless and the expectation of survival short. Evidence was given in the medical reports that therapy with "H 11" was associated with no effect in 32% of cases, with partial inhibition in 28% and with regression of growth in 40%. It should be pointed out that the 40% of cases included tumours of such inaccessible regions as the rectum, colon and stomach, and that the reduction of pain was regarded as probable evidence of the inhibition of the growing neoplasm. On the other hand, of 104 patients alive, 73 were still on treatment during their first twelve month period; 18 were still on treatment or under observation, treatment having been suspended during their second twelve month period; and 13 continued well and free from physical signs and symptoms during their third year since treatment began. In criticizing these figures the careful reader will note that no histories of these thirteen patients are given; there are no reports of biopsies or other criteria according to which the diagnoses can be checked. Further, the report cannot strictly be regarded as an independent investigation; though it has been written by an observer who is presumably not connected with the Hosa Research Laboratories, the material used belongs to those laboratories and is no doubt the material used by those who manufacture or sponsor the preparation. Other investigations that have been made are not favourable to "H 11". The ground that they cover is fairly extensive and as the references are all to the *British Medical Journal*, which is in the hands of every member in Australia, readers are advised to study the several papers at their leisure. The first reference comprises a group of papers. In the *British Medical Journal* of July 17, 1943, W. E. Gye, R. J. Ludford and Hilda Barlow report from the laboratories of the Imperial Cancer Research Fund the failure of "H 11" to inhibit the growth of tumours in mice. In the same journal H. A. Kidd makes observations on the use of "H 11" in carcinoma in man; and some important correspondence on these papers appears in the issue of July 31, 1943. The second reference appears in the *British Medical Journal* of August 21, 1943, and consists of an article on the effect of injections of "H 11" on the growth of mouse tumours. It will be noted that Gye and his collaborators found that "H 11" had no growth-inhibitory effects on the tumours used in the experiments. Thompson and two co-workers took Gye and his fellow workers to task in a letter, which is well worth reading, and elicited the blunt reply that "malignant tumours of mice which we have treated with H 11 continued to grow and killed the mice at the same rate as our untreated controls". Woodhouse reported that in 54 mice bearing different kinds of malignant tumour no inhibitory effect on the tumour growth was found after prolonged injections of the "urine preparation H 11 or similar extracts". He also reported that two sarcomata removed from mice after such injections were successfully grafted into other animals and that histological examinations of treated tumours showed no difference from control material. Kidd, on the clinical side, publishes a table setting out the relevant details about 51 cases in which "H 11" has been used; this should be studied with care by everyone interested in the subject. Kidd regards his report as an interim report; he thinks that no conclusions can be drawn "as the cases have not been followed up for a sufficient period". Thompson, in his letter of July 31, characterizes this statement as "irrelevant"; he makes this observation when he denies having made any claim to "cure". In spite of his refusal to draw conclusions, Kidd states that there is some evidence that in a few cases the rate of growth has been slowed up or inhibited, "but in no case confirmed by section has, as yet, any growth disappeared as the result of H 11 therapy only". He believes that no patient with carcinoma should be treated by "H 11" alone unless a competent surgeon has advised that it is inoperable and unsuitable for radiotherapy and other forms of treatment. "Treatment must be given for at least six months, and the cost should be carefully considered before advising or starting this form of therapy."

More than twelve months have passed since these reports on "H 11" were published and as far as can be discovered nothing fresh has appeared in any of the leading British or American journals. Clearly the scientific basis of the product is not unassailable and the practical value is far from proven. "H 11" must be classified among the products which will arouse false hopes among sufferers from cancer.

Current Comment.

"ENDOCHOLEDOCHAL SPHINCTEROTOMY."

No more satisfactory result can be obtained in surgery than that sometimes achieved when a patient gravely ill with cholecystitis and gall-stones has his gall-bladder removed and his biliary system drained. If results of this kind are to be the common experience of surgeons, the choice of persons submitted to operation must be made with great care and both skill and judgement have to be displayed by the surgeon. In actual experience results vary a good deal, and because brilliant successes are sometimes obtained, it does not necessarily follow that a poor result is to be credited to the surgeon. The kinds of results that may be expected have been described by many authors. An interesting description of end-results after gall-bladder operations together with a discussion on the causes of residual symptoms was published in 1939 by S. G. Meyers, D. J. Sandweiss and H. C. Saltzstein.[1] They reported on a series of 165 patients and found that 83% of those with calculous cholecystitis benefited from cholecystectomy and that only 41% of those whose cholecystitis was not accompanied by stones derived any benefit. Most clinicians with a reasonably large experience of disease affecting the upper regions of the abdomen can recall cases in which the patient's condition pointed clearly to the presence of gall-stones, but in which operation failed to reveal their presence. In these circumstances the gall-bladder may or may not have been removed because a pathological condition other than gall-stones and likely to produce symptoms was discovered. Of course, the finding of gall-stones in an inflamed gall-bladder does not mean that no other pathological condition accompanies the gall-bladder lesion. No surprise need therefore be felt if cholecystectomy does not relieve all the patient's symptoms. The conditions which might give rise to recurrent biliary symptoms in patients whose gall-bladders have been removed were stated by Meyers *et alii* to include residual biliary tract infection, biliary dyskinesia, common duct stones, chronic cholangitis and stones in the cystic duct. Symptoms that appear to have a biliary origin may be due to other conditions such as peptic ulcer, renal conditions and even coronary occlusion. To the condition of spastic dyskinesia of the biliary tract the term pseudocholecystitis has been applied. A recent discussion on the subject comes from the pen of Ralph Colp, who is clinical professor of surgery at the

[1] *American Journal of Digestive Diseases*, Volume V, 1938-1939, page 667.

College of Physicians and Surgeons of Columbia University, New York.[1]

Colp describes what he calls the post-cholecystectomy syndrome and bases his remarks on the findings in 253 cases in which operations for gall-bladder disease had been performed and in which the patients had been followed for periods varying from one to seven years. It was found that practically 40% of all patients suffered from post-operative symptoms, either temporary or permanent. This post-cholecystectomy syndrome consisted of pain which was of two main types—intense postprandial pain lasting from five minutes to two hours and sometimes radiating to the back, and pain radiating from the left upper abdominal quadrant to the shoulders, lasting from two to twenty-four hours and sometimes accompanied by persistent abdominal soreness. Colp holds that the syndrome is usually due to a dyskinesia of the sphincter mechanism. We need not follow him in his discussion on the sphincter mechanism of the biliary passages, since our object is to draw attention to a method of treatment carried out by him. It may, however, be well to draw attention to his view that as the physiological activity of the gall-bladder and the various sphincter mechanisms are so intimately correlated, cholecystectomy for cholecystitis with or without calculi will invariably be followed by alterations in the sphincter mechanism and in the pathological physiology of the common bile duct. In about 8% of Colp's cases symptoms persisted after operation in spite of treatment. In these cases surgical operation was advised. Before going into details about his own procedure, which goes by the fearsome name of endocholedochal sphincterotomy, Colp refers to two other methods that may be used to eliminate spasm of the sphincter of Oddi. These are dilatation of the sphincter and anastomosis between the common duct and the duodenum. Colp remarks that after dilatation a sphincter may eventually regain its tone and that recurrent attacks of spasm may ensue. We can go further than this, however, and recall some experimental observations, discussed in these columns some years ago, which showed that dilatation which overstretched the sphincter was followed by the formation of fibrous tissue and that the last state of the sphincter was likely to become worse than the first. Dilatation when carefully carried out may be effective, and in this regard readers are referred to an account given in 1934 by I. D. Miller of MacCormick's method of dilatation with Hegar's dilators.[2] In MacCormick's method the dilators are used in such a way that stones in the lower end of the common duct are discovered and may be removed. Sometimes it becomes necessary to open the duodenum and to remove a stone by incision of the opening of the duct into the duodenum. There is no need to emphasize either the importance of ensuring the removal of every stone from the lower end of the common duct or the difficulty of being certain that the duct is clear of stones. Anastomosis of the duodenum to the common duct is a difficult procedure and will not be undertaken if another method is available. Colp states that it is accompanied by risk of ascending infection by duodenal reflex. The method elaborated by Colp consists of division of the sphincter by a specially designed instrument which is introduced through the common bile duct. This instrument, a sphincterotome, has a blunt rounded end which contains a knife blade. The instrument is passed into the duodenum and is carefully withdrawn, and the sphincter is divided by the knife which has been exposed by a mechanism controlled by the handles of the instrument. He has used this instrument on seven occasions. Six of the patients have been followed: one for six years, one for five years, one for three years, two for eighteen months and one for six months. "All have shown definite improvement and have been relieved of their troublesome symptoms." It should be explained that Colp drains the bile duct after this procedure with a T-tube; he has not found "unusual bleeding" after it. Whether this operation will ever be widely adopted is doubtful. It is easy and perhaps right to decry such a procedure, and most surgeons will be likely to regard it as risky on account of the possibility of hæmorrhage into the duodenum from injury to its walls or from the cut sphincter and duct. Colp, however, occupies a responsible position in a teaching school and it may be well to keep an open mind about it.

[1] *Bulletin of the New York Academy of Medicine*, April, 1944.
[2] *The Australian and New Zealand Journal of Surgery*, Volume III, 1933-1934, page 265.

NITROBENZENE POISONING.

NITROBENZENE or oil of mirbane is a well-known toxic agent. It has assumed a greater importance during the last few years, but it is probable that most medical practitioners think that it is used in factories only. This is incorrect, for it is a substance widely used commercially, chiefly as a solvent for substances such as polishes, dyes, lacquers, perfumes and indelible inks. Further, it may exert toxic effects on man through absorption through the alimentary tract, the respiratory tract or the skin. In other words it may be swallowed, inhaled or absorbed through the external surfaces of the body. The acute symptoms of intoxication include nausea, vomiting, prostration, cyanosis and even convulsions or coma. One of the most striking effects is upon the blood, causing destruction of red cells, followed in favourable cases by rapid regeneration. Z. T. Wirtschafter and R. Wolpaw report a case of acute nitrobenzene poisoning in which the subject need not attract our sympathy as one exposed to industrial hazards, for in this case he drank fifteen cubic centimetres of black laundry marker ink mixed with denatured alcohol.[1]

Eleven hours later he was treated by gastric lavage, a glucose saline drip and oxygen and made a good recovery. The red blood cells numbered 4,390,000 per cubic millimetre, and the white cells 28,100, and aniline was found present in both blood and urine. Naturally the authors are not able to collect a series of cases of poisoning by marking ink, but they have made a full study of their patient and point out that the usual effects on the blood were in evidence. Unfortunately they were unable to make an examination for methæmoglobin during the first week of the illness. They noted, as have others, that the blood was dark brown in colour. It is to be hoped that if cases of nitrobenzene poisoning occur in well-equipped centres full spectroscopic examinations will be made of the plasma. Knowledge has accumulated rapidly of late years concerning the hæmolytic states, but there is room for a great deal more work. The work of Fairley and others on the blood pigments has been most illuminating in conditions like blackwater fever, and though we hope that our opportunities for studying this disease will soon be more limited, the spread of industrial medicine lies before us with some possible hazards of similar nature. The question of liver involvement was investigated in this case also. Definite evidence of lowered liver function was found, including a lowering of the albumin-globulin ratio in the blood, a decrease in cholesterol esters, and slight retention of bromsulphalein. The coagulation time of the blood was decreased and the viscosity increased: possibly these, too, were in part related to liver affection. Hepatic damage in this case might well be due in part to alcohol, as the patient's final libation to Bacchus was the conclusion of a drinking bout, but such damage is known to occur in nitrobenzene poisoning. Wright-Smith published notes of a case in this journal in which poisoning followed ingestion of a small amount of nitrobenzene by mouth, and here there seemed some evidence of liver damage.[2] It is interesting to note that in this case, too, the spectroscopic findings on the blood serum were not conclusive, suggesting that more work along these lines would be welcome.

Attention may well be directed to nitrobenzene. Cases have been reported in the literature following the normal use of furniture polish, and the wearing of freshly dyed shoes, so it is probable that the authors are correct when they state that toxic effects from this agent may be more frequent than is always recognized.

[1] *Annals of Internal Medicine*, July, 1944.
[2] THE MEDICAL JOURNAL OF AUSTRALIA, Volume I, 1929, page 867.

Abstracts from Medical Literature.

PÆDIATRICS.

Erythroblastosis Fœtalis.

J. R. GILMOUR (*Archives of Disease in Childhood*, March, 1944) has carried out examinations in fifty-two fatal cases of *erythroblastosis fœtalis*, particularly from the aspect of morbid anatomy. The cases have been grouped into three types which correspond to those recognized as *hydrops fœtalis*, *icterus gravis* and congenital anæmia, but they include a few atypical cases in which the change giving the name to the type is slight or absent. Evidence that the three types are merely varieties of a single disease is given by reference to the frequent occurrence of more than one type in siblings. The pathological similarities between the types are as follows. Jaundice sometimes occurred in type I and III, though seldom in type I. Œdema and effusions were usual in type I, but occasionally occurred in a lesser degree in other types. An abnormality in hæmopoiesis, with anæmia and excessive blood formation in the liver and other tissues, was present in all cases of type III and in most cases in the other types. Hæmosiderosis of the liver was very common in all types. The capsule and trabeculæ of the spleen in some cases of all types showed iron impregnation. Splenomegaly was very common in all types. An abnormality in endochondral ossification was very common in type I, it was present in one case of type III, and there was evidence that it occurred in two cases of type II reported in the literature. Decrease of reticulin or fibrin in the liver was common in type I and it occurred in a few cases of type II. Liquid infiltration of the suprarenal centre was common in type I and does not appear to occur in other diseases. Nuclear jaundice and jaundice of the renal medullary pyramids and foci of necrosis of the white matter occurred in type II and have been found in no other disease. The author also discusses the cause of *erythroblastosis fœtalis*.

MADGE THURLOW MACKLIN (*American Journal of Diseases of Children*, June, 1944) proposes a definition and clarification of the term *erythroblastosis fœtalis*. She points out that Rantmann in 1912 first applied the term *Erythroblastose* to a condition in an hydropic fœtus in which there was evidence of excess hæmopoiesis in the liver, spleen and kidneys. Since that time the term has been used to designate a group of conditions including fœtal hydrops, fatal jaundice of the newborn and congenital anæmia. Confusion now exists in the literature as to what constitutes erythroblastosis. There are those who state that hæmolysis is the distinguishing feature of the condition; others state that the essential criterion is the presence in the fœtus, at or near term, of extramedullary hæmopoiesis, while still others insist that the diagnosis of erythroblastosis should not be made unless the mother's blood is shown to be Rh-negative and that of the fœtus Rh-positive. The author defines erythroblastosis as a condition in which the blood of the fœtus exhibits immature cells of the erythrocyte series which are not normal, either as to type or as to quantity, for the stage of development of the fœtus. This condition may be displayed by numerous fœtuses, may or may not be accompanied by hæmolysis and may or may not be accompanied by extramedullary hæmopoiesis. It includes hæmolytic disease of the newborn as well as erythroblastosis due to factors other than hæmolysis. When it is due to an antigen-antibody reaction there will be hæmolysis with accumulation of iron in the fœtal liver and there will usually be persistent extramedullary hæmopoiesis. This form of erythroblastosis is hæmolytic disease of the newborn. In the majority of instances the hæmolysis appears to be due to the Rh factor complex. Factors such as anoxæmia cause erythroblastosis, as here defined, but no hæmolysis. If they begin to operate early in development, extramedullary hæmopoiesis will persist; if they begin just before term, formation of blood may be restricted to the bone marrow. A tentative explanation of the failure to find antibodies in the blood of the mothers of nine fœtuses showing erythroblastosis is advanced, based on a supposed immaturity of the antigen as it exists in an immature red cell, with corresponding specificity of the antibody for this particular antigen. At present the demonstration of the antibody depends on its reaction with the antigen as it exists in the mature red cell. Testing of the blood of the mother with that of the fœtus may demonstrate the presence of such antibodies. Another possible explanation is based on the recently discovered fact that there are at least six different Rh factors. Preparations of only the two commoner types of antigen are employed in the usual tests.

Atelectasis and Poliomyelitis.

M. COOPERSTOCK (*American Journal of Diseases of Children*, June, 1944) draws attention to the existence in poliomyelitis with involvement of the respiratory muscles of a constant threat of sequential development of bronchostenosis, atelectasis and secondary pneumonia, primarily due to the presence of the predisposing factors of diminished vital capacity of the lungs and impaired efficiency of the cough mechanism. This threat of serious pulmonary complications becomes imminent with the occurrence of infection of the respiratory tract. Of four patients with atelectasis complicating poliomyelitis with paralysis of the muscles of respiration, three recovered. The favourable outcome in these patients followed the occurrence of a critical clinical picture, undoubtedly due to the development of secondary pneumonia. Recovery appeared to depend on the favourable effect of treatment with sulphonamide compounds in the pneumonia process, permitting ultimate spontaneous clearing of the atelectasis. This clinical picture, which may develop gradually or within a short time, is characterized by fever, dyspnœa, cyanosis, rapid pulse, serious impairment of the cough mechanism and prostration. Recovery appeared to depend on the favourable effect of treatment with sulphonamide compounds in the pneumonia process, permitting ultimate spontaneous clearing of the atelectasis. In the prophylaxis against pulmonary complications, avoidance of exposure to infections of the respiratory tract is of utmost importance. With the occurrence of such infections the early institution of chemotherapy may be effective in preventing the development of more serious complications. The continued use of the mechanical respirator in such circumstances is essential. Although it was not employed for the patients reported in this article, the authors consider that the early use of bronchoscopy for this relief of bronchial occlusion may minimize pulmonary complications.

Prophylaxis of Neonatal Gonococcal Conjunctivitis.

MORRIS GLEICH, MARION BLUMBERG AND ALVIN S. MASON (*American Journal of Diseases of Children*, June, 1944) point out that there is still an appreciable incidence of neonatal gonococcal conjunctivitis in spite of legislation in forty-six of the United States requiring the instillation of silver compounds into the conjunctival sacs of every baby at birth. An investigation was carried out in the service for newborn infants at Harlem Hospital in order to prove the value of sulphathiazole in the prevention of gonococcal conjunctivitis. The routine instillation of silver nitrate into the conjunctival sacs of newborn infants was supplemented with the oral administration of sulphathiazole. From February 1, 1943, sulphathiazole was given orally as a prophylactic to all babies born in the hospital on odd days, while those born on even days received no drug and were used as controls. In both groups silver nitrate was instilled into the conjunctival sacs in the usual manner. Of the 2,687 babies born in the hospital during the thirteen months from February 1, 1943, to February 29, 1944, 1,425 were given sulphathiazole prophylactically, while 1,262 received no drug. The investigation showed that effective protection against gonococcal conjunctivitis was afforded by oral administration of sulphathiazole in a total dose of 20 grains given over three days, starting twelve hours after birth. As a result of this study, it is suggested that sulphathiazole be administered as a routine procedure by mouth for the prevention of neonatal gonococcal conjunctivitis as an adjunct to the existing prophylactic instillation of silver nitrate. This procedure would be of special value where medical attention is scarce and where consequently doctors do not attend to deliveries or fail to follow up the health of the babies during the neonatal period. The use of sulphathiazole according to instructions left by the doctor, nurse or midwife who delivered each baby would help to eradicate neonatal gonococcal conjunctivitis.

ORTHOPÆDIC SURGERY.

Parachute Injuries.

C. D. LORD AND J. W. COUTTS (*The Journal of Bone and Joint Surgery*, July, 1944) discuss the injuries commonly found among personnel training as parachute troops. Training is divided into four stages. Stage A: Calisthenics, rope-climbing, running and jumping into sawdust pits from a height of four to six feet. Stage B: Tumbling, "trainasium", landing trainer, jumps from mock doors (four to six feet), jumps from mock towers

(30 to 35 feet), and suspended harness drill. Stage C: Daily jumping from 250 foot towers (free and controlled) and landing by parachute on sawdust; tumbling is reviewed and parachute control is practised. Stage D: The making of the necessary number of plane jumps to qualify as a parachutist; the jumps are made from a plane in flight, and the landing is made on level and uneven terrain. The physical hardening in Stage A puts most applicants at something near physical perfection. It has been found that in men physically at their best, fear phenomena in the next three stages are less likely to develop. The most frequent cause of disability in Stage A is strain or tearing of the right rectus muscle, which closely simulates acute appendicitis. It occurs in rope-climbing. The typical injury of Stage B is acromio-clavicular contusion and acromio-clavicular separation; they are induced by tumbling not properly executed. In Stages C and D the typical injuries are due to landing by parachute; they are more severe in Stage D. The first of these injuries is the double fracture, involving the lower third of the fibula and the posterior lip of the tibia. The second typical parachute injury is the "silent fracture"; frequently the upper third of the fibula is fractured and the patient manifests few if any symptoms. This fracture may be mistaken for a sprained muscle. Dislocation of the fibular head has occurred in a small series of cases, but is increasing as ankle injuries diminish in frequency owing to a change in the technique of landing. With the opening shock of the parachute, while the soldier is falling freely, any type of fracture or injury may occur if the body position is incorrect. One injury was a deep laceration of the perineum, extending from the scrotum to and involving the *sphincter ani* and extending deeply enough to expose the lower segment of the rectum. The authors state that revision of various methods taught earlier has greatly reduced the incidence of certain types of injury during training; for example, the holding of the feet together on contact with the ground, instead of eighteen inches apart, has reduced the number of ankle fractures. A variation of the previously taught tumbling technique, and the institution of exacting supervision of each student before he enters Stage D, together with attention to the maintenance of all equipment and training aids, have been of value.

Hallux Valgus in Soldiers.

M. CLEVELAND, L. J. WILLIEN AND P. C. DORAN (*The Journal of Bone and Joint Surgery*, July, 1944) have investigated the surgical treatment of *hallux valgus* in troops in training during 1942. They hold that an operation of election, such as one for *hallux valgus*, cannot justify itself unless it results in full-duty status. Twenty-five soldiers and officers underwent the operation (including one nurse), and seven returned to and remained on full duty. These seven patients included the nurse; five of them had one foot only involved and a single operation. The authors state that this stands out as the most important single factor. The five soldiers were all in combat work and had difficult assignments. The nurse (and other nurses subsequently operated on) resumed full nursing duty, which, though arduous, does not compare with the work required of a combat soldier. Five patients who underwent McBride operations returned to full duty; only two of those who underwent Keller operations returned to full duty, but in this instance the factor of unilateral and bilateral operation requires consideration. In the cases in which the end-result is known, eight McBride operations were performed and six were unilateral; twelve Keller operations were performed and only three were unilateral. *Hallux valgus* is apt to be bilateral; but one foot is usually more deformed than the other, and the patient's complaint is centred on that foot. In civilian practice it is customary to recommend operation to both feet. The authors believe that they made a mistake in applying this principle to soldiers—the trauma of operation "has literally left the soldier without a leg to stand on"; they think this may largely account for the fact that so few returned to full duty. They recommend that, as the soldier is so dependent on his feet, the minimal operative procedures should be undertaken on them. They prefer the Keller operation, because wound healing is excellent, the technique is simple and cosmetic and functional results are satisfactory; also the length of stay in hospital is much shorter than that required after any of the other procedures used; no immobilization of the foot is required, and the patient becomes ambulatory in a short time. The McBride procedure was used next most frequently to the Keller operation. In a number of cases healing was bad, possibly owing to too tight closure of the wound. The authors state that in any operation performed with a tourniquet, the wound edges should be loosely approximated with interrupted sutures. They conclude that the operative treatment for bunions among soldiers in training, with the exception of army nurses, restores too few to full duty to justify its recommendation.

Knee-Joint Ligament Injuries.

L. C. ABBOTT, J. B. DEC. M. SAUNDERS, F. C. BOST AND C. E. ANDERSON (*The Journal of Bone and Joint Surgery*, July, 1944) discuss injuries to the ligaments of the knee joint. They state that such injuries are of frequent occurrence, owing to the increasing popularity of such sports as football, baseball and skiing. Examination of these injuries is often superficial and cursory, and in the absence of fracture they are too frequently labelled "internal derangement of the knee joint". A review of 26 cases shows the importance of early and exact diagnosis with immediate institution of the proper method of treatment. When this principle was followed, the results were excellent; when diagnosis was late and incomplete, the results were unsatisfactory. In combined lesions of the tibial collateral and anterior cruciate ligaments, prompt and complete repair of the tibial collateral ligament alone gave satisfactory restoration of function. Abduction rocking was revealed by examination and radiography in all injuries to the tibial collateral ligament alone or with associated damage to the cruciate ligaments. The opening on the medial aspect of the joint was minimal in isolated injuries to the tibial collateral ligament; it was greatly increased in the combined injuries to the ligaments of the knee joint. When pronounced abduction rocking was present, the findings were complete rupture of the tibial collateral ligament and often complete rupture of the anterior cruciate ligament. In some instances the anterior cruciate ligament appeared to be intact, until further careful inspection revealed that it was slack and was probably the site of injury to the body of the ligament, without loss of continuity of the synovial covering. The question as to whether an isolated lesion of the tibial collateral ligament will produce abduction rocking is of academic interest; the test for abduction rocking is valuable to determine the necessity or otherwise for operation. The authors find that an opening of the medial aspect of the joint is a sufficient indication for operation. If wide separation is present, operation is essential, as in combined lesions of the collateral and cruciate ligaments. In these cases, repair of the collateral ligaments is essential to secure a completely stable joint.

Fractures of the Neck of the Femur.

I. E. SIRIS AND J. D. RYAN (*Surgery, Gynecology and Obstetrics*, June, 1944) discuss their results in 157 cases of intracapsular and extracapsular fractures of the neck of the femur. They state that attention must be centred primarily on the saving of the patient's life. They believe that by immediate internal fixation of all fractures about the hip the mortality from these injuries has been reduced and the incidence of union increased. Although it has been argued that frail and feeble patients may not stand the operative procedure, the authors point out that such patients may have difficulty in surviving the complications of the conservative methods of treatment. They conclude that the treatment of choice for intracapsular fractures in aged and feeble patients is the immediate insertion of a Smith-Petersen cannulated three-flanged nail or similar device. The treatment of choice for intertrochanteric fractures in the aged is the immediate insertion of a device incorporating the principles of a Smith-Petersen nail and Hawley bar, preferably a Moore-Blount blade plate. For intertrochanteric fractures in younger patients, bilateral Russell traction suspension gives satisfactory results. External pin fixation should not replace internal fixation for fractures of the hip or intertrochanteric region. It is a hazardous procedure, and its use should be restricted to those who are familiar with the technique. The authors disagree with the policy of selection of survivals, by which all patients are treated conservatively for a few days, and then operation is decided upon only for those who are expected to survive. Immediate operation permits early painless movement in bed, reduced incidence of potential complications and early ambulation with crutches. The surgeon will be enabled to hasten the proper insertion of the transfixion device by the use of local anæsthesia, focal skin clips and guide wires, and three sets of radiographs, to determine (*a*) the accuracy of reduction and the location of the skin clip in relation to the head of the femur, (*b*) the position of the guide wires, (*c*) the position of the nail.

Research.

BRIEF HISTORY OF THE DRUGS SUBCOMMITTEE OF THE AUSTRALIAN ASSOCIATION OF SCIENTIFIC WORKERS, NEW SOUTH WALES BRANCH.[1]

THE Drugs Subcommittee was the first of those groups of voluntary workers which set out to utilize the resources of this country to forestall any shortage of essential synthetic drugs likely to arise out of the war.

The formation of such a subcommittee was first mooted in August, 1939, when the newly formed Association of Scientific Workers asked a number of scientists working on drugs to form an advisory panel to cope with a possible emergency situation. At the first meeting, held in September, 1939, after the outbreak of war, the following policy was formulated:

(a) To produce a descriptive list of essential drugs of such a nature as would enable a prescriber to order, under one brand name, a drug which he had commonly prescribed under another one more familiar to him. This measure was designed to provide for those apparent scarcities which disappeared whenever chemical identity of drugs bearing different names could be proved.

(b) To devise practicable processes for manufacturing essential drugs from raw materials available in Australia.

(c) To manufacture such drugs until industry had equipped itself to undertake their preparation, and to give industry every assistance in establishing their manufacture.

The subcommittee began by holding weekly meetings in the University of Sydney. Its first members were Mr. W. Lockwood (convener), Dr. A. Albert (editor), Dr. V. M. Trikojus, Dr. A. Abbie, Dr. C. B. Cox, Dr. R. Lemberg and Dr. D. White. Four of these members belonged to the university staff, two came from the Institute of Medical Research of the Royal North Shore Hospital and one from the Commonwealth School of Public Health and Tropical Medicine. No time was lost in establishing communication with the Medical Equipment Control Committee of the Department of Defence Coordination. The Medical Equipment Control Committee had accumulated large stocks of essential drugs a year before war began. It gave encouragement, but did not at that time see its way to avail itself of the Drugs Subcommittee's services.

In 1940 the subcommittee published its "List of Drug Synonyms and Trade-Names", edited by Dr. Albert. The cost of its production was borne by the Pharmaceutical Association of Australia and New Zealand, and the cost of its distribution to all physicians and pharmacists in both dominions was shared between the British Medical Association and the Pharmaceutical Association. This list played a useful part at a time when the supply of branded medicines, many of which had come from Germany, was seriously disorganized.

Later in 1940 the subcommittee reopened correspondence with the Medical Equipment Control Committee to which a new and vigorous chairman, Sir Alan Newton, had been appointed. The new chairman, however, pointed out that, as long as the sea lanes from Europe and America remained open, it was his duty to import drugs for Australia rather than strain her undeveloped organic chemical industry by forcing it into premature activity. The subcommittee, whilst not denying the general soundness of this principle, thought it its duty to point out that, in the event of the sea lanes closing, local industry would be in no position to go immediately into production with synthetic drugs, since no drug had ever been synthesized in Australia on the commercial scale. The chemical industry of this country was, in fact, at that time and for some time afterwards still in the stage of setting up the production in Australia of those primary and secondary chemicals which are its very backbone. The subcommittee foresaw that Australian manufacturers would not be free for some very considerable time to devote their energies to mastering the intricacies of modern synthetic drug production, no matter how great the need.

The subcommittee therefore ascertained which drugs presented the most pressing problems. They then asked the Research Committee of the University of Sydney for money to pay for research assistants out of a fund placed at the university's disposal by the Commonwealth Government. This money was readily granted. A team of research assistants, mainly young graduates, gradually came into being to carry out full-time research for the subcommittee. Members of the subcommittee devoted all their spare time to this work, but in a purely honorary capacity.

The research programme was initiated as follows: Dr. Lemberg and Mr. Lockwood were asked to work on phenobarbitone, Dr. White on sulphapyridine (at that time the newest and best of the sulphonamides), and Dr. Albert was to continue his researches on proflavine and to look into the synthesis of "Atebrin". Dr. Trikojus undertook the supervision of the research assistants. The first of these, Mr. N. Graves, during the six months that he spent with the subcommittee, completed a synthesis of Acetarsol, British Pharmacopœia, from locally produced raw materials. The yields throughout were good, and it would have been possible for any firm of manufacturing chemists to have taken over the process and produced this arsenical, which is used in the treatment of syphilis in New South Wales. Although no acute shortage of arsenicals has arisen, the subcommittee does not regard such work as wasted: it is rather in the nature of an insurance policy against possible future shortages. Eventually, as the result of this research, the manufacture of the three most important types of arsenicals was further investigated by Sydney and Melbourne firms, and at least one such drug is already in production.

The most necessary project undertaken by the subcommittee at this period was the production of a veterinary remedy for the Queensland Government. This substance, a di-quinolyl urea derivative known as "Acaprin", had been obtainable only from Germany, and was the only specific known for the fatal tick-bite fever in cattle, a disease caused by a protozoon injected with the tick's saliva. Had the subcommittee not been able to undertake this project, the food situation in northern Australia would have suffered at a time when increasing demands were being made on it. In the Sydney Technical College, where facilities were put at the disposal of the subcommittee by the Principal, Mr. Swain, two years' supply of this drug, representing a pre-war market value of £500, was produced under the supervision of Dr. F. H. Reuter, who volunteered for this work. He was assisted by Mr. R. Goldacre, who had been seconded from the Department of Agriculture. The synthesis was a most unpleasant one involving the use of the poison gas, phosgene, and no firm could at that time be induced to take it up. However, at the suggestion of a member of the Association of Scientific Workers, his firm (Bayer Pharma Proprietary, Limited) was approached on the matter, and it met a considerable part of the expenses involved in the work, made arrangements for ampouling the finished product, and subsequently agreed to produce further quantities of the drug if called for. In August, 1941, Dr. Abbie handed over the first 75 grammes of "Acaprin" to the chairman of the Medical Equipment Control Committee in Melbourne.

Meanwhile the subcommittee had started on other projects. In 1940, Mr. Cortis Jones, M.Sc., was engaged to assist Dr. Trikojus in the production of ascorbic acid (vitamin *C*) from Australian glucose which was being made available then for the first time in a state of chemical purity. The first step in this synthesis is the reduction of glucose under pressure to sorbitol, and it was realized that whilst the pressure apparatus was being built—a job which took many months in spite of the high priority afforded by the Medical Equipment Control Committee—it would be wise to acquire as much as possible of the American sorbitol which had been imported into this country as a glycerin substitute. This sorbitol was bio-oxidized to sorbose by the organism *Acetobacter suboxydans*. Professor H. K. Ward arranged for a culture of this organism to be brought by air from the United States. When Dr. White had almost completed his work on sulphapyridine, Dr. Forgan, of May and Baker, Limited, arrived from London and lodged with the subcommittee details of his firm's laboratory processes for the same drug. Once again, therefore, the subcommittee's work had to be written off as so much wartime insurance. When the production of sulphonamides in Australia became a more pressing problem, newer drugs of this series, which have been evolved during the war, were those that received attention, as will be recounted later. The experience gained by Dr. White, however, has proved helpful in this work.

Towards the end of 1940 a reorganization of the subcommittee became necessary because several members had

[1] This report is being published simultaneously in *The Australasian Journal of Pharmacy*, *The Australian Journal of Science* and THE MEDICAL JOURNAL OF AUSTRALIA.

gone to other spheres of activity. Dr. (now Major) Cox had gone abroad with the army; Dr. White took up an appointment in Melbourne: as a corresponding member of the subcommittee, he effected a liaison with the Melbourne drugs group which was at that time being formed; Mr. Lockwood was appointed to a government post in Canberra. The new chairman of the subcommittee was Dr. Trikojus; Dr. Albert was asked to combine secretarial duties with editorial work under the title of "recorder", and has continued in that office up to the present time.

Mr. Lockwood's departure brought research on phenobarbitone at Royal North Shore Hospital to an end, but it was taken up for a while by Mr. R. Gascoigne, a graduand working under Dr. Trikojus. Mr. Gascoigne also helped in the sulphapyridine work. Dr. Trikojus, who was succeeded in the chair by Dr. Abbie, was subsequently invited to be the subcommittee's Director of Research, and until he was appointed Professor of Biochemistry at Melbourne in 1943, he organized a programme of vigorous research into drug production in the Department of Medicine in the University of Sydney. Thus full wartime use was made of that department's facilities which Professor Lambie put at his disposal.

From March, 1941, onwards, because of the changed war situation, the Medical Equipment Control Committee began more positively to foster the production of synthetic drugs in Australia. It gave most necessary assistance to the subcommittee in the matter of priorities for apparatus and materials. In return it took over the subcommittee's processes as soon as completed, and officially requested firms which were appropriately equipped to put them into immediate production. In most cases the research assistant engaged on each project has followed it into the factory, and, by becoming an employee of the company concerned, has materially assisted the transformation of the subcommittee's pilot-scale processes into full-scale production.

In March, 1941, Professor Ashby and Dr. Albert were summoned to Melbourne at short notice to discuss with the Medical Equipment Control Committee questions of plant, factory space and quantity of materials that would be concerned in the production of ascorbic acid, the first drug whose production was sponsored by the Medical Equipment Control Committee. Mr. Cortis Jones supplied the greater part of the information used on this visit and added considerably to it throughout 1941 and 1942 as the result of his laboratory work. This work, because it involved a fermentation stage, was conducted partly in pilot plant at the university and partly in a well-known Sydney brewery through the cooperation of its chief chemist, Mr. Hartigan. Later, the Medical Equipment Control Committee allocated production to the Colonial Sugar Refining Company with whose cooperation the subcommittee produced several pounds of vitamin *C*. Having subsequently solved the problems connected with small-scale production, the subcommittee was requested by the Medical Equipment Control Committee to transfer all information on this drug to the company, which engaged Mr. Cortis Jones to see the drug into large-scale production. The present annual output of ascorbic acid in Australia is quite considerable and has rendered timely aid in maintaining the health of troops fighting in the tropics.

All praise should go to Professor E. Ashby, the first president of the Association of Scientific Workers, for his success in securing official recognition of the subcommittee's potentialities. Throughout 1941 he was visiting Melbourne weekly in connexion with his founding of the Scientific Liaison Bureau. On these visits he did much to facilitate the progress of mutual understanding between the subcommittee and the Medical Equipment Control Committee. Official recognition of his special abilities in this direction came in 1941 when the Medical Equipment Control Committee appointed him coordinator of an integrating committee consisting of the chairmen of the individual drugs committees in the various States (New South Wales, Victoria and South Australia). This was a loosely knit type of coordination, but because of this very flexibility it worked successfully by assigning to each State committee the problems that it was best equipped to tackle. As the drugs committees in the other two States were not connected with the Australian Association of Scientific Workers, duplication of activities had to be provided against in such a manner.

In March, 1941, the subcommittee was strengthened by the cooption of Professor J. C. Earl, who became chairman at the end of that year when Dr. (now Major) Abbie entered the army. Early in 1941 the subcommittee relinquished the services of Mr. Gascoigne, but his phenobarbitone work was taken over by Mr. I. Nicholson, M.Sc., who was seconded by the New South Wales Department of Agriculture. About the same time, Mr. Graves, who had been seconded for six months by British Australian Lead Manufacturers Proprietary, Limited, had to rejoin his firm to assist in its wartime problems. Amongst other temporary accessions to the staff about ths time must be mentioned Miss L. Wright, Mrs. Kingsley Strack and Dr. O'Dwyer, who helped the ascorbic acid work through some difficult stages, including a most alarming period when the *Acetobacter* temporarily lost its biosynthetic properties because of the lack of some unknown growth factor.

At this time Dr. Reuter was collaborating with the committee in the synthesis of microscopical stains, but before the work had gone far these substances began to be manufactured in Sydney, so that the subcommittee was relieved of the necessity of pursuing the subject further.

During 1941 the proflavine synthesis developed by Dr. Albert was put into production by a small Sydney firm which was unable to meet the demands of the Services because the necessary intermediates were not all available in Australia in a sufficient degree of purity. At this stage Professor Earl undertook to get large-scale production under way because a large demand for this drug had arisen in the army. To obtain specialist supervision of manufacture on the spot, permission was obtained from the Vice-Chancellor to develop the process in the technological laboratory of the Department of Organic and Applied Chemistry in the University of Sydney. A firm which had not hitherto been interested in drug production was persuaded to provide labour and raw materials and eventually supervision, the product being consigned to the Services. Many difficulties were encountered, but early in 1942 the plant, which was reconstructed by the firm, was in operation. Nevertheless it was not until the beginning of 1943 that sufficient of the product was produced to meet defence requirements, which in that year amounted to several hundredweights of chemically pure material.

Towards the end of 1941, demands for sulphaguanidine, for the treatment of bacterial dysentery, became most pressing and industry was in no position to meet them. Dr. Trikojus in collaboration with Mr. G. K. Hughes effected an improvement on the published process and together they produced what was considered at that time to be a most substantial quantity. These two workers were obliged to work the clock round to complete army orders within scheduled time. In 1942 a Melbourne firm relieved them of this heavy burden of responsibility.

Early 1942 saw the completion of the work on phenobarbitone, and the entire process, which contained many novel features (extemporized by Mr. Nicholson and Dr. Trikojus to meet the raw material situation), and which produced an overall yield exceeding that given in the literature, was handed over to the Medical Equipment Control Committee, which allocated it for production by another Melbourne firm.

It was now, for the first time, that the subcommittee was able to overcome a long-standing difficulty by securing financial assistance for the extra-university work carried on by Dr. Lemberg. Accordingly Mr. F. Harrison was engaged to assist at the Royal North Shore Hospital in research into the production of nikethamide, a respiratory stimulant of which "Coramine" is a well-known brand. This work was completed satisfactorily, but the use of this drug has since declined and a shortage did not arise.

Mention must be made of the great help given the subcommittee by Professor H. K. Ward and Dr. H. Jensen in bacteriological testing and advice and by Dr. F. Shaw in the performance of toxicity tests.

Early in 1942 Professor Ward was coopted to the subcommittee and Mr. G. K. Hughes joined it somewhat later. This year might be called the "'Atebrin' year", for the virtual blockade which Australia was then enjoying, coupled with the disorganization of distribution abroad, produced a dangerous shortage of this potent antimalarial. As the fall of Java had cut off the Allied supply of quinine, there was no other drug available for malaria. In spite of the difficulties attending its synthesis, the subcommittee resolved to continue investigating the synthesis of this drug with a view to cutting down on the twenty stages involved in the published processes, and, side by side with this, working out new syntheses if practicable from Australian raw materials. Professor Earl placed a number of his research students under the joint supervision of himself and Dr. Albert to work on this drug. Dr. Albert also took it on as a full-time research project, but a month later was suddenly taken ill and underwent a serious operation. Meanwhile the Adelaide and Melbourne drugs groups cooperated in certain stages of this work. By August it had become clear that even with the considerable technical advances that had been made in Sydney, the production of "Atebrin" was impracticable in

Australia because the production of each 1,000 pounds would have required the importation of many times that weight of intermediates, as follows: 2,200 pounds of acetanilide or its equivalent in acetic acid, 3,600 pounds of acetoacetic ester, 1,800 pounds of thionyl chloride, 1,800 pounds of ethylene-chlorhydrin, 2,250 pounds of diethylamine, 1,000 pounds of phosphorus oxychloride, 800 pounds of *p*-anisidine, *plus* a number of less weighty items.

The subcommittee reported to this effect and suggested to the Medical Equipment Control Committee that, since an army mission abroad would seem inevitable to press for immediate shipment of this urgently needed drug, a member of the subcommittee should accompany it to facilitate all chemical discussions and to make available the technical improvements discovered in Sydney.

This suggestion was well received and Dr. Albert was seconded to the army for four months to accompany the Director of Medicine, Colonel (now Brigadier) Fairley, C.B.E., F.R.S., to America and England for this purpose. The mission was a success and regular supplies of this drug have reached the Australian forces from that time onwards. It is pleasing to record that English firms making this drug were very pleased to learn of the subcommittee's technical improvements in the process and that at least one firm has adopted them. Incidentally the insect repellent, dimethyl phthalate, was selected by this mission from an American list of promising substances, and its production by three Australian firms was put in hand at once. The securing of antimalarial supplies combined with the manufacture in Australia of sulphaguanidine, as was described above, did much to turn the fortunes of war in our favour during the worst period of the New Guinea campaign.

During 1942 the subcommittee engaged a graduand, Miss McVicar, and a pharmacist, Mr. J. E. Falk, B.Sc., to make a supply of a certain blood preservative, for which pressing demands were being made. The preparation of this substance is being continued by Professor Trikojus in Melbourne, another important use having been found for it. Subsequently Mr. Falk took up employment in a firm which had been requested by the Medical Equipment Control Committee to take over the subcommittee's process for mersalyl, a mercurial diuretic. This change-over was facilitated by the firm sending its chemist (Miss N. Thomas) to work on mersalyl under Dr. Trikojus. Just before he left the subcommittee's research staff in 1943, Mr. Falk carried out the first pilot-scale work on 5-aminoacridine which Dr. Albert had developed (1940-1942) and for which a demand had arisen in a military base hospital. Production of this drug was entrusted by the Medical Equipment Control Committee to the firm making mersalyl, and it is marketed here under the name of "Monacrin". Simultaneously it is being made in England under the name of "Acramine". In both countries it is used with success in cases of long-standing sepsis that have resisted sulphonamide therapy.

In 1943, Dr. Lemberg, assisted by Mr. R. Hackman (a graduand financed by the Scientific Liaison Bureau) worked out processes for the manufacture in Australia of two X-ray diagnostic contrast agents for urological work.

Also in 1943 some work was carried out in conjunction with the Adelaide group on a new drug, sulphamerazine, which has only recently been removed from the secret list. The large-scale production of this drug represents a model of collaboration between the South Australian voluntary drug workers, the State and private enterprise. Although seventeen chemical stages are involved, the drug was got into full-scale production within nine months after the request for its production came from the Director of Medicine of the Army. The manufacture of this drug in Australia not only protects our forces from mishap in case "Atebrin" should fail to arrive from overseas—for it is a potent antimalarial—but it also provides a safer and more potent successor to sulphapyridine, sulphathiazole and sulphadiazine. It is anticipated that sulphamerazine will soon be made available for urgent civilian requirements.

It is impossible in a summary like this to depict the activities of this subcommittee very fully or to give any true indication of the extent of time that every member gave to its work in spite of other onerous duties. One of Dr. Abbie's last acts as chairman, for instance, was to complete a census of microscopes in New South Wales for the Surgical Instrument Panel of the Medical Equipment Control Committee. No mention, too, can be made of the subcommittee as an inquiry bureau, or of the various analyses that have been carried out for the Services, or of the work in devising standards for the purity of newly introduced drugs and even substances which are not strictly classed as drugs, such as the insect repellent, dimethyl phthalate, and the insecticide, "D.D.T." Pressing for the enforcement of these standards constituted another of the subcommittee's activities.

It is pleasant to report that by the end of 1943 it was possible to relax the subcommittee's endeavours very considerably. Industry at last had largely caught up with demands, and the restoration of a good measure of freedom to the seas has removed most of the sense of desperate emergency under which the subcommittee laboured during the first four years of this long war.

Medical Societies.

MELBOURNE PÆDIATRIC SOCIETY.

A MEETING of the Melbourne Pædiatric Society was held on November 17, 1943, at the Children's Hospital, Carlton, Melbourne, DR. W. FORSTER, the President, in the chair.[1]

Acute Appendicitis.

DR. S. G. ANDERSON read a paper entitled "A Statistical Survey of Appendicitis in Children" (see page 567).

DR. H. DOUGLAS STEPHENS thanked Dr. Anderson for showing what was happening in cases of acute appendicitis. On the whole the results obtained were not good. Dr. Stephens held that if a young child had an acute appendiceal abscess, simple drainage was called for; but the parents should be told to submit the patient for appendicectomy three months later. Frequently such patients were allowed to go on to the age of seven years or later, when the child might get a fresh suppuration of the appendix and intestinal obstruction.

DR. WILFRED FORSTER said that it was gratifying to know that resident medical officers occasionally went through such figures in the hospital records. It would be helpful to learn why the death rate was so high in young children. This was possibly attributable in part at least to the late stage at which the diagnosis was made. It would be interesting to be furnished with facts dealing with the time after the onset of the illness at which operation was performed. Frequently in these cases a wrong diagnosis of vomiting and diarrhœa was made. This mistake could often be avoided if an anæsthetic was given.

DR. MARGARET ROBERTSON thought that Dr. Anderson had given food for thought in the diagnosis and treatment of such cases.

DR. L. WAIT asked whether the sulphonamide drugs were used in any of these cases. He said that "The Medical Annual" gave figures on the use of sulphathiazole post-operatively and also at operation to reduce wound infection. These figures demonstrated that a great reduction in mortality could be obtained by this means. Dr. Anderson's figures would be interesting for comparison with the latter findings.

DR. ROBERT SOUTHBY said that he was especially interested in the figures relating to delay in convalescence. He noticed that pyelitis and pneumonia figured amongst the list of factors contributing to delay. He asked whether in these cases mistaken diagnoses had been made in the first place, the condition being not acute appendicitis, but pyelitis or pneumonia. In this respect diagnosis was not always easy. He recalled three cases met with in one week. In the first there was a typical history of acute appendicitis, but the appendix was not inflamed and a right basal pneumonia soon became manifest. In the second the history was similar. The child was "baked" for forty-eight hours, and went on to develop an appendiceal abscess. In the third case also the same history was given. An acutely inflamed appendix was removed, and two days later signs of pneumonia appeared at the base of the right lung. With regard to the use of an anæsthetic agent for babies, Dr. Southby said that chloroform had much to recommend it. The students were taught how to administer ether and the danger of chloroform was stressed, so that they were afraid to use it. The late Hamilton Russell had said that chloroform was quite safe if one realized the physical characteristics of chloroform vapour—that being heavier than air, it should be held over the face of the baby, plenty of space being left between the mask and the face. The danger was that owing to the usual teaching to concentrate the ether, one was inclined to administer chloroform in the same fashion.

[1] The clinical demonstrations made at this meeting will be described in a subsequent issue.

DR. KEITH HALLAM said that the high mortality rate was indeed partly attributable to the late diagnosis. On the other hand, a number of patients were unnecessarily submitted to operation because of hasty diagnosis. Dr. Hallam suggested that a further source of investigation would be to analyse all patients subjected to operation and to note the percentage of normals amongst them. With regard to sulphonamides, he said that it would be valuable if the pus was examined and the type of organism responsible was learnt and the appropriate sulphonamide given in adequate dosages. Various types of organisms were found. An energetic resident medical officer might well take up such an investigation.

Dr. Anderson, in reply, said that the duration of illness before operation varied from hours to days. The number of cases analysed was too small for a scientific opinion to be given, but apparently the length of the illness did not materially affect the mortality rate in those cases at least. With regard to the use of the sulphonamide drugs, again, the number of cases was inadequate; but in those cases in which sulphonamides were used, they did seem to reduce infection. With regard to the appearance of pyelitis and pneumonia in convalescence, Dr. Anderson said that at any rate these cases were "reported" as of acute appendicitis. In two or three cases pneumonia appeared a day or two after the operation. In the majority, complications occurred ten to twelve days after the appendicectomy.

Correspondence.

THE REPATRIATION DEPARTMENT AND EX-SERVICE PERSONNEL.

SIR: The attitude of the medical officers of the Repatriation Department towards ex-service personnel who have suffered from pleurisy rather puzzles me. Recently I saw a man who had been discharged from the Royal Australian Air Force on account of "recurrent non-tuberculous pleurisy". He was receiving a pension of seven shillings and sixpence a week.

At the time he consulted me he was obviously not well, suffering from cough, loss of weight, anorexia and persistent digestive disturbance. His history disclosed that he had suffered from pleurisy with effusion in 1942 and again in 1943. There had been a reaction to the Mantoux test, but two specimens of gastric contents had been cultured for tubercle bacilli and none were found.

The X-ray I took of his chest showed signs of old pleurisy at the right base and an indefinite opacity at the left apex, suggestive of an early tuberculous lesion. This man seemed to be shaping for a breakdown from tuberculosis. It appears that, for the reason that no tubercle bacilli were recovered from the gastric contents, the condition was looked upon as non-tuberculous. It is an entirely new conception to me that a diagnosis of tuberculous pleurisy can be ruled out because of failure to find tubercle bacilli in the gastric cultures. For over thirty years I have been teaching that we must be prepared to make a diagnosis of tuberculosis even if no tubercle bacilli are found in sputum, pleural fluid or anywhere else. It seems that the policy of the Repatriation Department is putting the clock back thirty years, and that the patients must develop a grave open lesion before tuberculosis is diagnosed. Is this what is called "giving the benefit of the doubt" to ex-service men?

In fairness to the medical officers of the local Repatriation Department, I must add that this sufferer was not a South Australian.

Yours, etc.,

D. R. W. COWAN.

163, North Terrace,
Adelaide,
November 6, 1944.

THE URETERS IN HYSTERECTOMY.

SIR: When it became necessary for experimental purposes to do hysterectomies on mice, one of the problems was how to avoid the ureters, as these are not readily visible. We therefore injected indigo-carmine intravenously so that the line of the ureter was readily seen, and if the ureters had been divided the urine would have been easily identified.

It occurred to me that this procedure might possibly be useful in pelvic operations on human beings. It is doubtful whether the blue colour would show through the ureteric wall, but if the ureter became damaged in any way its contents at least would be readily recognized.

Yours, etc.,

R. DOUGLAS WRIGHT,
Professor of Physiology.

Department of Physiology,
University of Melbourne,
November 8, 1944.

THE MEETING OF THE FEDERAL COUNCIL.

SIR: One of the recent discussions of the Federal Council concerning the present honorary system as reported in THE MEDICAL JOURNAL OF AUSTRALIA of October 28, 1944, has not brought out any definite policy.

The question is: "Does the present honorary system act to the best advantage of patients, doctors and students?"

Firstly, in the case of the patients: What is the treatment of the average patient? The patient has a varying period of waiting for one hour to over four hours from the time he calls at the office to register. He is interviewed by doctors who are invariably understaffed and overworked in the clinic, and cannot receive adequate and efficient treatment compared with that of a patient in Macquarie Street. There is no continuity of service unless the patient is a rare interesting case, and he may see any one of three or four doctors who are in the clinic. Little if any attempt at evaluation of psychological factors is attempted in any of the illnesses. After hours of waiting and a brief examination, unless the patient is the target of a clinic, when he has over much attention and many thoughts of disturbing illnesses put into his mind, the patient then has a further wait to receive the medicines.

In the case of the doctors the clinics are far too big and the doctor is unable to devote sufficient time and care to the patient, and protest to the office is ineffective as the clinics are limited in number and the patients have to be seen. The rush and bustle of the clinic and constant overwork of the staff is against the doctor deriving the desired experience and learning that he would like to get in his honorary task. More can be learnt in the post-graduate study course in one week than by one year's attendance at an out-patients' department. Only a small percentage of doctors in Sydney can become attached as an honorary, and the attainment of multiple appointments by a few men frustrate many men who desire to keep their attachment to a large public hospital.

From the students' point of view the honorary doctors are not always the best of teachers; 25% of my clinical teachers were definitely bad, 5% not even attempting teaching. The atmosphere of the out-patient department is bad for the future training of the general practitioner, giving him a distorted view of practice.

Can these faults be remedied and a more efficient system for patients, doctors and students instituted? Undoubtedly this could be done. Unnecessary waiting of the patients could be reduced to a minimum by greatly increasing the number of clinics and giving the patient at least ten minutes' interview with the doctor and twenty minutes in the case of a new patient's consultation. Patients should not be herded like sheep, but should be made to feel an individual; this is particularly important in the case of poor women with large families, who are often unable to waste the required three or four hours hanging around an out-patients' department with two or three children and have to get home to get the children's tea and put them to bed and look after general domestic affairs.

If every doctor could retain some connexion with the large hospital where he trained and return for further knowledge, and at the same time give back some of the knowledge which he must have obtained in practice, that is, practical psychology in home and family environment in its application for treatment of disease, a better standard of medical education and interest would result both for graduates and undergraduates.

As regards students, by increasing the medical staff there would be more scope for choosing suitable teachers who should be paid an adequate remuneration for their services and who feel and live up to their responsibility in the training of the future medical profession. The excellence of the extra-mural teachers we find in London and Edinburgh is a marked contrast to the efforts of some clinical teachers who, having received their appointments by fortuitous circumstances, academic distinction *et cetera*, and not by their ability and willingness to teach, make no effort to live

up to the duties that should be expected from a conscientious honorary in a training hospital.

Yours, etc.,

270, Bondi Road, Bondi, New South Wales. November 13, 1944.

B. WILLIAMS.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, changes *et cetera* have been promulgated in the *Commonwealth of Australia Gazette*, Number 228, of November 16, 1944.

Royal Australian Air Force.

Reserve: Medical Branch.

The following officers are transferred from the Active List with effect from the dates indicated: (Temporary Squadron Leaders) D. C. Howle (261264), 1st October, 1944, H. S. Kirkland (1181) (on part-time list), 16th October, 1944.—(Ex. Min. No. 296—Approved 15th November, 1944.)

Post-Graduate Work.

COURSES IN SYDNEY.

Residential Courses in Obstetrics.

THE New South Wales Post-Graduate Committee in Medicine announces that residential courses in obstetrics will be held at the Royal Hospital for Women, Paddington, and the Women's Hospital, Crown Street, from January 1 to 6, 1945, inclusive. Attendances will be limited to the following numbers of post-graduate students: the Royal Hospital for Women, 11; the Women's Hospital, 12.

The fee for each course will be £5 5s., including board and residence, and applications together with the amount of the fee should be forwarded as soon as possible to the Secretary of the Post-Graduate Committee, 131, Macquarie Street, Sydney, from whom copies of the programmes may be obtained.

General Revision Course.

The Post-Graduate Committee desires to announce that the next general revision course will begin on May 21, 1945. Further information may be obtained from the Secretary of the committee. Telephone B 4606.

Obituary.

WILLIAM JOSEPH MANERY.

WE regret to announce the death of Dr. William Joseph Manery, which occurred on November 14, 1944, at Sydney.

Nominations and Elections.

THE undermentioned has applied for election as a member of the New South Wales Branch of the British Medical Association:

Feher, Stephen, M.D., 1924 (Frankfurt), M.D., 1927 (Graz), 149, Macquarie Street, Sydney.

THE undermentioned has applied for election as a member of the Tasmanian Branch of the British Medical Association:

Fordyce, John Leys, M.B., B.S., 1944 (Univ. Melbourne), Box 41, Latrobe, Tasmania.

Medical Appointments.

His Honour Judge Markell, K.C., has been appointed Chairman of the Disciplinary Tribunal constituted under the *Medical Practitioners Act*, 1938-1939, New South Wales.

Dr. Hilda Hamilton has been appointed Temporary Medical Officer, Laboratory of Microbiology and Pathology, Department of Health and Home Affairs, Queensland.

Diary for the Month.

Nov. 28.—New South Wales Branch, B.M.A.: Ethics Committee.
Nov. 30.—New South Wales Branch, B.M.A.: Branch Meeting.
Nov. 30.—South Australian Branch, B.M.A.: Scientific Meeting.
Dec. 5.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
Dec. 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
Dec. 6.—Western Australian Branch, B.M.A.: Council Meeting.
Dec. 6.—Victorian Branch, B.M.A.: Branch Meeting.
Dec. 6.—Victorian Branch, B.M.A.: Council Meeting.
Dec. 7.—South Australian Branch, B.M.A.: Council Meeting.
Dec. 7.—New South Wales Branch, B.M.A.: Special Groups Committee.
Dec. 11.—Victorian Branch, B.M.A.: Executive Meeting.
Dec. 12.—Tasmanian Branch, B.M.A.: Branch Meeting.
Dec. 12.—New South Wales Branch, B.M.A.: Medical Politics Committee.
Dec. 13.—Victorian Branch, B.M.A.: Council Meeting.
Dec. 14.—New South Wales Branch, B.M.A.: Branch Meeting.
Dec. 15.—Queensland Branch, B.M.A.: Council Meeting.
Dec. 15.—Queensland Branch, B.M.A.: Annual Meeting.
Dec. 19.—New South Wales Branch, B.M.A.: Ethics Committee.
Dec. 21.—South Australian Branch, B.M.A.: Council Meeting.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phœnix Mutual Provident Society.

Victorian Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Wiluna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

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